

COMPUTERWORLD

Windows 3.1 ready to roll

Users optimistic but plan to approach Microsoft upgrade with caution

BY CHRISTOPHER LINDQUIST
and ROSEMARY HAMILTON
CW STAFF

SEATTLE — It began here last week in a Federal Express Corp. warehouse, and no one is sure when it will end, but the hype and hoopla for Microsoft Corp.'s Windows 3.1 is under way.

It is still in some doubt, however, whether users will snag the new release at the frenetic pace they did Windows 3.0 — 10 million licenses sold in less than two years.

"I don't know if I'm out to undertake another conversion

right now," said John Stingl, vice president of office automation at Seattle-based Pacific First Bank, which has been a Windows 3.0 site since June 1990.

Tempting new users

Stingl said his 2,000 personal computers running Windows 3.0 are "working very smoothly." But making Windows work even more smoothly, with improved stability, ease of use, speed and application support, is what Microsoft hopes will bring users into the Windows 3.1 fold.

Several users said they are preparing to evaluate Windows

3.1 in hopes that it will actually meet those objectives. "I think we'll go with [Windows 3.1]," said Wayne Hoeschen, vice president of the information systems division at St. Paul Cos., a Windows shop.

The product will go through a standard test period, he said, but if it meets his requirements — including the much-vaunted improved stability — Microsoft may be rewarded with a mass upgrade of the firm's 2,000 Windows-based machines.

Some users will give Windows 3.1 some time in the market test

Continued on page 8

Novell to detail plan for distributed mail

BY JIM NASH
and JOANIE M. WEXLER
CW STAFF

SALT LAKE CITY — A key building block for Novell, Inc.'s NetWare-centric distributed computing strategy is expected to emerge this week from the NetWare developers conference here.

The networking company is reportedly set to announce a messaging module for its NetWare 3.X server. The module links multiple mail environments and supports the controversial gamut of emerging programming interfaces for mail-enabled applications, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C., and other analysts who have been briefed.

Novell declined to verify the timing of the announcement but did confirm product details.

Following a script

Integrating a heterogeneous messaging server with the NetWare network operating system is consistent with recent Novell moves to stock its servers with functions that could turn them into hubs for tying together enterprisewide computing pockets.

With these efforts, Novell is

"looking to be the *lingua franca* for any application and protocol," said Peter Storer, manager of applications development at The Acord Corp., an insurance association and Novell shop in White Plains, N.Y.

Carey Heckman, Novell director of messaging products marketing, agreed: "Novell aims

One size fits all

Novell's unfolding 'universal' server is projected to do the following:

- Integrate varying types of modular servers with enterprise-oriented 3.X NetWare.
- Become a corporate network reconciliation point.
- Replace multiple, specialized server devices.

to be the integration platform and focus of processing power within the enterprise."

This strategy could give NetWare a greater role in corporate computing schemes than competing networks such as Banyan Systems, Inc.'s Vines and Microsoft Corp.'s LAN Manager.

Banyan shop Blue Cross/Blue Shield of Pennsylvania said it has discussed the universal server concept with Banyan to "give network managers fewer specialized servers" to worry about, said Mike Kinsey, lead communi-

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At Au Bon Pain, accent is on client/server

BY MARYFRAN JOHNSON
CW STAFF

BOSTON — More than 22,000 customers visited the Au Bon Pain in Cambridge's Harvard Square last week — 5,500 of them arriving at the French cafe before 11 a.m. and spending an average of \$1.86 on breakfast. Decadent croissants made up 22.58% of all products sold.

How does Au Bon Pain, based here, know all this? Its Retail Operations Report says so.

Thanks to a newly installed client/server system, Au Bon Pain is leveraging a distributed network of personal computers, a single Unix server at corporate headquarters and customized software to provide managers with "every number they need to run the business," MIS director Mark Factor said.

"We heard from a half dozen managers last week, saying how quickly they picked up the new report and how they loved it," Factor said. "There's been a serious amount of excitement about this."

By Monday afternoon each week, company executives have a highly customized report in hand that summarizes a blizzard of data on 75 stores — figures on

Continued on page 14



"All the real action is out in our stores, and we are leveraging our PC investment by putting the [initial] processing out there."

Mark Factor
MIS director, Au Bon Pain

Latest IBM notebooks to take low-cost road

Aggressive tack takes focus off features, pressures price-sensitive vendors

BY MICHAEL FITZGERALD
CW STAFF

WHITE PLAINS, N.Y. — After several earlier stumbles, IBM will enter the notebook comput-

er market tomorrow with products that compete more on price than on features, according to sources close to the company.

IBM will also take a shot at the high end of the laptop market with an 11-pound portable featuring an active-matrix color screen.

Users who were interviewed said they liked the notebook's aggressive pricing and expressed more enthusiasm about IBM's prospects than they had during the company's previous forays into portable computing.

IBM's entry-level machine, the Personal System/2 55note N51SX, will weigh in at 6.2 pounds and was designed around Intel Corp.'s 16-MHz 80386SX chip. The Micro Channel Architecture-based notebook will list for \$2,250, meaning its street price will be about \$1,800, analysts said.

A model based on a 16-MHz version of IBM's homegrown 386SLC chip is due in May, the sources said, and will cost \$3,250.

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INSIDE

Ultrix users mull over DEC/OSF/1, which is expected to ship this week. Page 4.

Oracle's pay-as-you-go plan for Version 7.0 could cost it some customers. Page 7.

Cabletron to offer lower-cost network management. Page 12.

Product Spotlight — Are RISC workstations corporate enough, or do they just look that way? Page 85.

Networking top issue

Sun rates No. 1 in networking, which users see as the most important workstation category.

See Buyers' Scorecard, page 96

Networking capability

(user importance rating: 8.8)

SPARCstation IPC/IPX	8.4
DECstation 5000 Model 25	8.1
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HP Apollo 720	7.6



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Quotable

"This computer is Levi's, not Armani."

PORTIA ISAACSON
DREAM IT

On Grid's new pen-based system. See story page 24.

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EXECUTIVE BRIEFING

■ **Novell is readying a multilingual E-mail module** for its LAN servers as part of an overall strategy to render NetWare the United Nations of distributed corporate networks. The strategy puts NetWare at the center of corporate E-mail hubs, a place now more commonly occupied by mainframes. **Page 1.**

■ **The new, low-end RISC workstations** are not inspiring mass migration from DOS. Users best poised for across-the-board conversion are those with big investments in workstations or those planning to develop entirely new applications, generally using workstations and terminals. **Page 85.**

■ **Microsoft, says Windows 3.1 is ready to roll**, with more than 1 million copies and a TV campaign that should be set to go by April 6. But while some users welcome the upgrade, others are taking their time, having just stabilized their 3.0 investment. **Page 1.** Microsoft's marketing glitz isn't budging IBM, which refuses to respond in kind. **Page 8.**

■ **The next killer PC software** isn't going to be a single application, such as a spreadsheet, but a set of powerful tools that support users in acquiring and analyzing internal and external information. PCs will be transformed into user partners, selecting and processing information in background mode to make it digestible for the user. **Page 99.**

■ **Cabletron will try to rev up** the reportedly stodgy sales of its 'kitchen sink' network management system this week by halving its price and adding key applications. **Page 12.**

■ **Hewlett-Packard is expected** to announce that it will embed network data-gathering chips right into its hubs, routers and adapters. **Page 4.**

■ **Grid Systems puts DOS computing on your wrist**, but the 2.8-pound unit doesn't exactly look like a Rolex. The company is targeting niche markets such as transportation lines and utilities for the \$2,895 machine. **Page 24.**

■ **DEC will begin shipping an OSF/1 compliant** operating system this week and fortifies its commitment by virtually halting Ultrix development. **Page 4.**

■ **Apple has decided that if you can't beat 'em, join**

'em: It is announcing a laser printer and scanner for Microsoft's Windows. **Page 10.**

■ **A complete skills assessment** can help map out future learning plans by listing skills, training and extra-curricular activities needed for advancement in your company. **Page 111.**

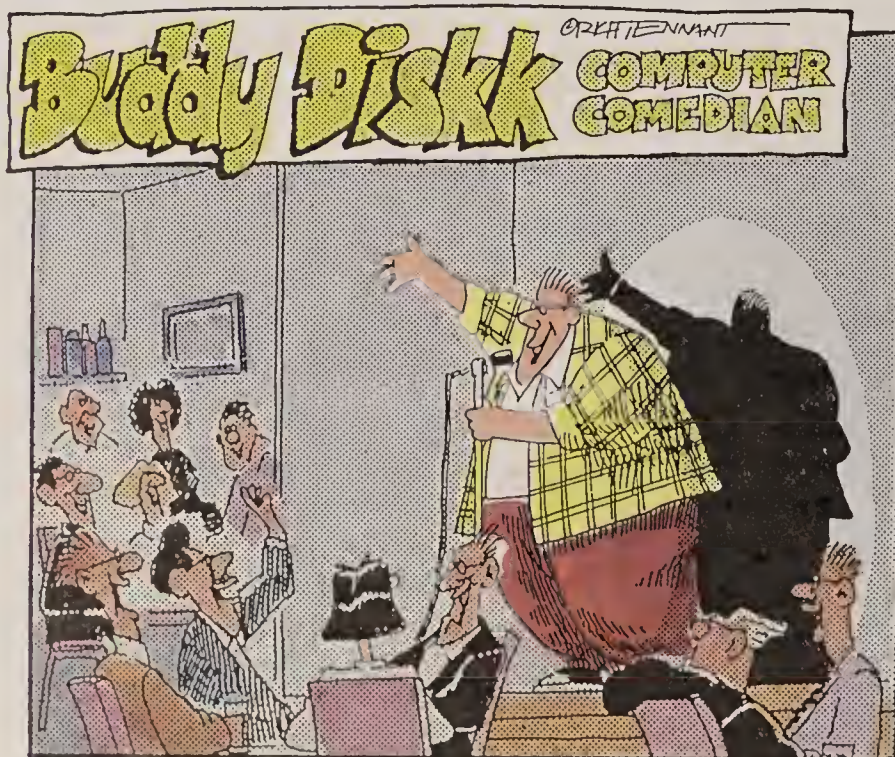
■ **Lotus' plan to sell suites of software** is welcomed by potential customers because it gives them one more option in putting together buying plans. **Page 35.**

■ **The end may be near for parallel data networks** in which a user has to maintain essentially separate IBM Systems Network Architecture networks and interconnected LANs. Several vendors are working to make it easier to move data between the diverse environments. **Page 65.**

■ **Sales: You can do it with furniture — and with concepts.** When furniture retailer Breuners deciding to pull out its mainframe, IS management had to sell its staff on the values of learning terms like 'Unix' and 'C.' **Page 105.**

■ **On site this week:** Data center reorganization doesn't have to take years. Bankers Trust expects an immediate bonanza of savings from operations automation. **Page 75.** Get the network in place, and only then invest in the new computers to go with it. That's the strategy that chip maker Zilog uses to take advantage of falling hardware prices. **Page 59.** When it was time to move from old Honeywell systems to DEC VAXs, the city of Irvine, Calif., found a way to do it without abandoning its Pick-based applications. **Page 79.**

The 5th Wave



Can't get enough of The 5th Wave? Rich Tennant's new book of 5th Wave cartoons, published by Andrews and McMeel, is available now in bookstores or by calling (800) 826-4216.

"THE OTHER DAY A FRIEND OF MINE TELLS ME HE HAS TO GET RID OF HIS APPLE COMPUTER BECAUSE IT'S GETTING TOO OLD. I ASK HIM HOW HE CAN TELL, AND HE SAYS, IT'S STARTING TO ATTRACT FRUIT FLIES! SERIOUSLY!"



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DEC makes OSF/1 a reality

Users mull migration path from Ultrix; package ships this week

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. will begin shipping its version of the Open Software Foundation's OSF/1 operating system this week, marking a key public moment in its shift away from its current Ultrix operating system to a more standard Unix.

Unlike IBM and Hewlett-Packard Co., which are also committed to supporting OSF/1, DEC has driven a larger stake in the ground by virtually halting Ultrix development work and pouring its resources into DEC/OSF/1.

While some Ultrix users may feel a pang of worry about migrating from Ultrix to DEC/OSF/1, others expressed confidence that DEC will provide a well-lit path. Still others said they are simply indifferent, figuring the Ultrix-to-OSF/1 mi-

gration is a problem for their software vendors.

"At this juncture, I'm leaving it to Datatel to worry about," said John Steward, MIS director at the Public Securities Association in New York. Datatel, Inc. is the association's software vendor for a membership and accounting package that runs under Ultrix on the organization's DECstation 5000 Model 200.

Yet an apparent lack of information about the migration from Ultrix to DEC/OSF/1 has been bothering Mohamed el Lozy, director of scientific computing at the Dana-Farber Cancer Institute in Boston.

"We are very worried. We don't have a clue what's going on, and what we read in the trade press doesn't give the detail we need," el Lozy said. "I am as loyal a DEC customer as you will find in the Unix world, but I'm not sure how much longer I will remain so."

NASA Langley Research Center in Hampton, Va., will be getting its first look at DEC/OSF/1 in June, when the new operating system arrives on a DEC workstation, systems manager Robert Grandle said.

"The biggest thing that OSF will buy us, if everyone adopts it, is one set of management tools for Unix," said Grandle, whose shop runs a variety of Unix machines. "We'd like to have one standard Unix again, and OSF/1 seems like a step toward getting to a more unified environment."

The DEC/OSF/1.0 version shipping this week is expected to appeal most to software developers and customers delving into their own applications development, according to Steve McIntosh, a marketing manager at DEC. The vendor has also prepared an extensive migration guide for moving between the two Unixes.

One limitation of 1.0 is that it

supports only 32 users, he added, but the 2.0 version shipping this summer will support the 256 users that Ultrix can handle.

As evidence of support from the software community, DEC pointed to more than 90 independent software vendors lined up behind DEC/OSF/1, including a few high-profile companies such as Autodesk, Inc. and Oracle Corp.

"I'm not going to do anything until my CAD vendor is ready," said Ken Krallman, MIS director

at Carleton Technologies, Inc., an aerospace defense contractor in Orchard Park, N.Y. "Frankly, I'm more nervous about moving from [Apple Computer, Inc. Macintosh Operating] System 6.0 to System 7.0 than I am in going from Ultrix to OSF/1."

"DEC does its best to smooth out the bumps," said Homer Hoe, information systems manager at Denver-based Tenneco Minerals Co., which uses two DECsystem 5500 servers for general business computing.

Hidden treasures

The DEC/OSF/1 operating system provides features not available on Ultrix systems, including the following:

- OSF/1 kernel, based on the Mach kernel developed at Carnegie Mellon University.
- OSF Motif as the default windowing interface.
- Improved standards conformance, including Posix 1003.1, XPG3 and ANSI C.
- Shared libraries as part of the programming environment, which saves disk space and memory by allowing several applications to use a single copy of a library routine.
- Logical volume management, which enables expanded data storage, retrieval and protection.

Lighter NewWave ready for PC plunge

BY JAMES DALY
and JEAN BOZMAN
CW STAFF

PALO ALTO, Calif. — It will be "surf's up" for Hewlett-Packard Co. today when the company unveils an updated version of NewWave desktop manager that halves its voracious disk storage requirements, automates cer-

speculation that NewWave will be bundled with Digital Research, Inc.'s (DRI) DR DOS operating system. HP already has close ties to DRI through Novell, Inc., which purchased DRI last July [CW, July 22, 1991]. "There are a whole series of things we're working on," said Webb McKinney, general manager of HP's Cooperative Computing

some trouble getting Windows 3.1 to work in the DR DOS environment. "They've been relatively minor, and [DRI] is promising a patch within 30 days, so we're keeping our fingers crossed," said Ron Kosar, enterprise network manager at Martin Marietta Corp.'s Aerospace & Naval Systems Division in Baltimore. Version 4.0 is the third release of NewWave since it was introduced in September 1989. Version 3.0 was released in September 1990.

HP's NewWave is an icon-based user interface built with object-oriented technology. It displays Windows 3.0 applications as a series of icons, rather than as a cascading array of windows. In addition, a special "agent" feature allows users to record their keystrokes for later use. In this way, NewWave can send electronic mail at 2 a.m., for example, and files can be automatically retrieved from a mainframe computer overnight.

NewWave's agent has also become more powerful in Version 4.0. Represented by an icon of a man with slicked-back hair and dark sunglasses, the agent carries out repetitive tasks. Agent tasks can now be event driven, so that the arrival of E-mail could trigger a prompt on the user's screen, for example.

HP is also using Microsoft Corp.'s Dynamically Linked Library to allow any agent task in one application to call up a second Windows application. Applications share information through Microsoft's Dynamic Data Exchange.

Division.

NewWave "has become a nice niche product in integrated environments, but it has the potential to have a much broader appeal with DR DOS," said Thomas Kucharvy, president of Summit Strategies, Inc., a market strategy firm in Boston. Only about 225,000 units of NewWave had been shipped by the end of 1991, HP officials said.

DRI has also reportedly had

HP unveils chip upgrade to manage LANs with EASE

BY ELISABETH HORWITT
CW STAFF

ROSEVILLE, Calif. — Hewlett-Packard Co. is expected next week to announce a breakthrough chip technology that will embed network data-gathering intelligence across its entire line of local-area network bridges, routers, hubs and cards.

For a nominal upgrade price, HP network devices will be able to do their own reporting of network errors and traffic levels to HP's OpenView network management platform, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. This in turn will save users from having to install LAN monitors at each site, at a cost of several thousand dollars or more per monitor, Dzubeck said.

Developed by HP's instrumentation division, the new Embedded Advance Sampling Environment (EASE) "is a data-gathering mechanism that allows users to do predictive and remedial network management," Dzubeck said.

EASE consists of a chip with flash erasable programmable read-only memory that will be embedded in HP's EtherTwist, ThinLAN and Fiber Distributed Data Interface lines of LAN hubs, adapters and routers, Dzubeck said.

The chip can be programmed to "sample" the type and volume of network traffic passing

through a given network device, he added.

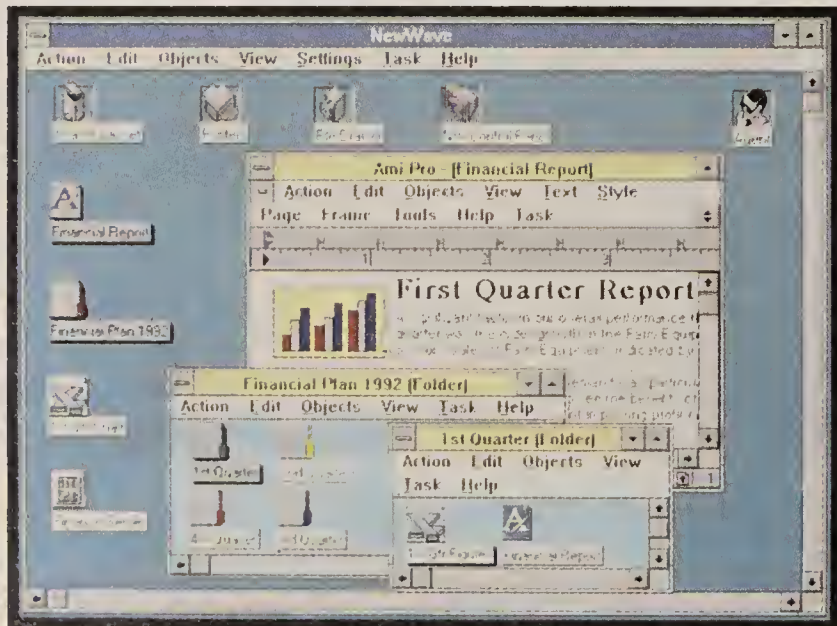
"It does things like track errors to their sources," as well as measure the volume of traffic generated by a network protocol such as Novell, Inc.'s IPX, Apple Computer, Inc.'s AppleTalk or Transmission Control Protocol/Internet Protocol (TCP/IP), Dzubeck said. Another potential application is measuring electronic-mail packets traveling across a network link, to determine the need to upgrade E-mail servers, he added.

An HP spokeswoman confirmed that the vendor is preparing "the biggest network management introduction of the year."

HP is also expected to announce several OpenView modules designed to handle information coming in from EASE, Dzubeck said. They include the following:

- The history analyzer makes sense out of the trends represented by incoming data.
- OpenView Resource Manager can monitor up to five network entities in terms of the levels of TCP/IP, IPX and Macintosh traffic they process; number of bytes sent; and the number of packet senders per packet receiver.
- Management modules for HP's EtherTwist line of hubs, routers and bridges.

Both EASE and the OpenView modules are expected to become available on April 1.



HP's NewWave, enhanced to reduce storage requirements, is an icon-based user interface built with object-oriented features

tain tasks and eases the importing and installation of applications.

NewWave Version 4.0, priced at \$195, has been enhanced to reduce storage requirements from 13M to 7M bytes. However, users will also need to use an IBM-compatible personal computer with an Intel Corp. 80286 and 2M bytes of random-access memory.

The update has also renewed

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NEWS SHORTS

CA loses motion to dismiss . . .

Computer Associates International, Inc. last week lost a motion to dismiss all but one of the multiple counts in the lawsuit Electronic Data Systems Corp. filed against it earlier this year. The denial does not say a thing about who is right or wrong; it does mean that the court is unprepared to find EDS' complaints groundless at this point. The suit will continue to edge toward trial.

. . . and acquires metrics tools

CA bought three software metrics products last week from Howard Rubin Associates, Inc., an information systems productivity consultancy in Pound Ridge, N.Y. The personal computer-based products, which are priced between \$9,400 and \$11,600, measure function points, cost efficiency and timeliness of application development projects. CA will add the packages to its existing four-product line of metrics tools.

HP buys Convex stake

Hewlett-Packard Co. and Convex Computer Corp. in Richardson, Texas, last week announced a joint technology agreement under which Convex will use HP's Precision Architecture-RISC chips to build a new generation of massively parallel systems. At the same time, HP said it had made a 5% equity investment in \$200 million Convex. HP has no immediate plans to remarket the Convex supercomputers, but the firm said it intends to make technology gains in parallel processing systems for commercial applications, said Lewis E. Platt, HP's executive vice president.

Cheap multimedia en route?

Analog Devices, Inc. last week announced technology and vendor alliances aimed at integrating voice, video, music, still images, speech recognition, text-to-speech conversion, fax, modem and other applications on a single microprocessor board. The company expects that by combining its integrated chip technology — called signal processing — with software from application-specific software vendors, it will bring relatively inexpensive multimedia functions to today's PCs and narrow-band local-area networks. The chip set is priced at \$25, compared with \$200 or more for single-application circuit boards available today.

Font designers win copyright shield

The U.S. Copyright Office put out a ruling last week vindicating font programmers in their quest for protection under copyright law. Developers of font digitizing and printing programs are now entitled to copyright protection. The action was brought by Bitstream, Inc. Previously, the Copyright Office would not distinguish between the copyrighting of typeface designs and the computer programs generating the designs.

Short takes

Packard Bell Electronics, Inc. last week filed for an initial public offering of 5.2 million shares of common stock at \$13.50 to \$15.50 per share. . . . **Du Pont Pixel**, a Du Pont Co. subsidiary, has officially licensed OpenGL, from **Silicon Graphics, Inc.**, for the Sun Microsystems, Inc. Scalable Processor Architecture platform. . . . **Pyramid Technology Corp.** in San Jose, Calif., said it expects to report an operating loss in the second quarter ending Friday, along with revenue that is flat or lower than the previous year's. . . . **Colonial Gas Co.**, a Lowell, Mass.-based utility, has awarded a \$17 million systems integration contract to **Andersen Consulting** to build a line of applications based on cooperative processing. . . . **Clarix Corp.**, based in Santa Clara, Calif., revamped its software licensing to allow a single copy of a software package to be used on office, home and portable computers without requiring additional licenses. . . . Los Angeles-based **Digitalk, Inc.** said that it is developing a version of its **Smalltalk/V** object-oriented programming language for Unix, which is slated to be delivered by the end of the year.

More news shorts on page 16

MCI to build no-fault FAA net

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Six months after an AT&T power failure left many air travelers stranded in midair, the Federal Aviation Administration (FAA) last week tapped MCI Communications Corp. to build a failure-proof air traffic control network. The estimated \$856 million, 10-year contract represents a major coup for MCI against rival AT&T, currently the FAA's primary network provider.

The Leased Interfacility National Airspace Communications System (LINCS) will interconnect thousands of FAA facilities nationwide, carrying air traffic controller-to-pilot communications, radar information and data flowing among computers at various FAA centers, the administration said.

"We realized some time ago that we needed a network to meet our reliability and availability requirements and to avoid single-point failures," said Douglas Kay, a technical assistant at the FAA's telecommunications management and operations division.

After divestiture, the FAA contracted separately for each new circuit from various carriers, with no guarantee that supposedly "diverse" circuits did

not run through the same physical point, Kay said. "So a failure could wipe out a large segment of links," he said. Indeed, that is just what happened during AT&T's September power outage because links among several regional air traffic controller centers all traveled through the downed AT&T switch.

A major criterion for the LINCS contract is 99.999% availability, Kay added. If MCI fails to meet this requirement, it will pay a financial penalty.

No connection to outage

An initial field of dozens of bidders shrank down to the big three — MCI, AT&T and U.S. Sprint Communications Co. The fact that the FAA did not award the contract to AT&T — which currently supplies most of its leased lines — has nothing to do with the AT&T power outage that downed much of the FAA's East Coast network, according to Kay.

However, the September outage may well have helped the FAA convince the General Services Administration that the FAA "has special requirements not served by a normal telephone system," Kay said.

The LINCS request for proposals left it up to bidders to decide how to meet its network availability and reliability re-

quirements, Kay said. "We didn't want to tell them how to do their business. Otherwise, we could be blamed for an outage." The FAA steered away from a common Fortune 500 practice of dividing network facilities among two or more carriers because it wanted a single provider to take responsibility for the network, Kay said.

MCI plans to meet the FAA's requirements by building a digital backbone of T1 and T3 links, with guaranteed routing diversity and intelligent multiplexers to automatically reroute traffic around network failures, MCI spokesman Michael Serbousek said. In areas where MCI lacks the facilities to guarantee diversity, the carrier will use lines from other carriers, he added. The FAA expects to take two to three years to complete migration to LINCS System, Kay said.

The multiplexers will be Newbridge Networks Corp.'s MainStreet Bandwidth Managers. A network control center in Reston, Va., staffed by MCI employees and equipped with Newbridge's 4602 MainStreet NetworkStation management system will monitor the network. Some 250 MCI employees will be dedicated to supporting the FAA network at the center and at FAA sites throughout the country, Serbousek said.

Canadian ministry saves \$1M with backup center

BY JOHANNA AMBROSIO
CW STAFF

TORONTO — When the Ministry of Revenue puts the finishing touches on its backup data center in a few weeks, it will have completed what may be Canada's largest "lights-out" operation.

Furthermore, the ministry will pay less for both centers than what it was paying for one. "In our new contract, we're saving \$1 million over what it had cost for one data center," said John Randolph, assistant deputy minister and chief information officer. Randolph is understandably sensitive about finances, given his employer's role as the province's tax collector. The ministry processes about \$20 billion in revenue annually.

Even with its high degree of automation, the data center here will not be human-free. People go there several times a week to move tapes and set up "scratch" or blank tapes to accept new jobs. However, with the addition of a larger tape stacker in a few weeks, those trips will be re-

duced to one per week.

The ministry's experience mirrors what is happening in the industry at large, observers said. While there are some shops that absolutely want lights-out automation, most are moving toward a middle ground of automating everything they can and then monitoring all the data centers from one command center in the main shop.

"I don't know if lights-out is really the goal anymore," said Bob Kivi, a consultant at Cap Gemini America in Canoga Park, Ill. Instead, he said, increasing numbers of large information systems shops are opting to consolidate and simplify operations to whatever degree is possible, given both the state of the technology and the comfort level of the user management.

No cash for salaries

Because cost was an overriding factor at the ministry, "It was not feasible to have any staff" in the center, Randolph said. The Toronto facility is about 25 miles away from the main data center in Oshawa, Ontario.

In each site there is an IBM Enterprise System/9000 mainframe — a 9121 Model 440 — as well as 3390 disk drives and a Storage Technology Corp. tape silo. Both mainframes have production jobs running. "We wanted the backup center operating, not just sitting there," Randolph said.

He called the Storage Tek equipment "a critical piece of our ability to go lights-out." Initially, he said, IBM was "not thrilled" with the Storage Tek gear, especially given that the Toronto data center is in a space leased by IBM. "We had to insist on it, and they eventually agreed. It may be a sign of the new IBM," Randolph said.

Additionally, the ministry is using IBM's Target System Control Facility (TSCF) to operate the Toronto data center from the Oshawa site. The product consists of software that sits on both the mainframe and a personal computer, connected via a Token Ring local-area network. With TSCF, Randolph said, if one mainframe goes down or is degraded, users can be switched over to the other.

Tests indicated that in the case of a catastrophic failure, it would take about 24 hours to make the second site operational, a time frame that Randolph termed acceptable.

Oracle policy prompts pricing worries

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp.'s decision to enforce pay-as-you-use pricing for its next-generation distributed database has some users worried about heavy migration costs.

Version 7.0 — due to be shipped later this year — will be offered with three add-on modules that will be priced separately from the base product. The modules include a procedural database option, a distributed database option and a parallel server option for loosely coupled systems, according to Kenneth Jacobs, vice president of Oracle's relational database management system marketing.

The additional Version 7.0 modules will cost users 20% to 50% more than the base product, industry analysts said.

Users will not necessarily pay more for Version 7.0 as a result. Those who have used Oracle for some time will probably not have to pay extra for the upgrade, analysts said. However, the total price for the base product and add-ons could nearly double for new users, compared with the previous version.

More than expected

This fragmentation of function may disappoint Version 6.0 users who planned a relatively inexpensive upgrade to Version 7.0, users said. "People will be paying an extra amount for something they expected to have" in the core product, said Warren Capps, director of information services at STR Corp. in Reston, Va., and president of the Mid-Atlantic Oracle Users Group.

Prices for the Oracle Version 7.0 options will vary according to the user's hardware platform, Jacobs said last week. "We will have the same premium for these options across platforms," he said.

"We've tried to follow a fair pricing policy," Jacobs told more than 400 users gathered at a recent Oracle user group meeting in Rockville, Md. "We know that all of you won't require all of the functions we have built into Version 7.0," which will support distributed queries, stored procedures, triggers, row-level locking and security features.

However, Oracle has been criticized in the past for selling a separate Transaction Processing Option (TPO) for Oracle 6.0, industry analysts noted. That option was priced at 40% of the cost of the Version 6.0 base product.

This time, some of the key features promised for Version 7.0, such as distributed updates, two-phase commits and remote procedure calls, will be available only in the distributed database option. Programming features — stored procedures that store application code in the database and triggers to activate database functions — will be part of the procedural database option.

Some users already approve of Oracle's pay-as-you-go pricing plan. "Some of my clients might appreciate this, especially if they wanted Version 7.0 for performance and not for distributed processing," said a Virginia-based consultant who asked not to be identified. "If you don't want additional features, you won't have to pay for them."

Oracle's moves could be viewed as a further unbundling of the core RDBMS product. In the past, Oracle broke out

programming tools such as the SQLForms application development kit and the SQLReportwriter forms generator, as separate software modules. Analysts said they expect the trend toward unbundling the Oracle system to continue as \$1.03 billion Oracle seeks new avenues of growth.

Be a smart shopper

"You have to become a smarter consumer," explained Aaron Zornes, vice president of application development strategies at Meta Group, Inc. in Stamford, Conn. "Most users expect a certain increase in performance as part of their

15% software maintenance fee. But that fee just guarantees that the software bugs will be fixed on time and that your calls to technical support will get answered."

Some groups of Version 6.0 users will receive a free upgrade on certain options, Jacobs said. Users who have paid for the TPO for Oracle Version 6.0 will receive the procedural



Oracle's Jacobs: 'We've tried to follow a fair pricing policy' for Version 7.0

option for Oracle Version 7.0 at no charge. All Digital Equipment Corp. VMS users who own Oracle Version 6.0 or 6.2 will receive the parallel server option for Version 7.0 at no charge, Jacobs said. Oracle had been criticized in 1989 and 1990 for failing to repair a performance problem with Oracle 6.0 in VAXclusters; that problem was fixed with the Oracle 6.2 "parallel server option" released in March 1991.



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IBM's HelpWare draws polite applause

BY CAROL HILDEBRAND
CW STAFF

ATLANTA — IBM continued resculpting its personal computer division with a new emphasis on service and support as it announced its HelpWare here last week.

Although users and analysts both marked the move as a step in the right direction, nobody saw it as the answer to IBM's prayers.

"IBM is running up the down escalator still," said Bruce Stephen, director of PC hardware

and pricing research at International Data Corp. in Framingham, Mass. Stephen added that he thought it was vital for IBM to establish a sense of continuity in the market once again.

IBM's three-point initiative includes HelpLearn, an OS/2 and Personal System/2 education program; HelpBuy, which targets small businesses and home buyers with a financing and leasing program; and the centerpiece, HelpCenter.

Located in Atlanta, HelpCenter is a toll-free clearinghouse for any user with ques-

tions concerning the PS/2 family or OS/2.

IBM stressed that although the phone number could be used for technical support, its first purpose was to serve as a focal point for those lost in the IBM maze. All previous programs would be rolled into the HelpWare umbrella, IBM said [CW, March 16].

Service bent detected

At least one user has seen a more service-oriented bent from the company.

"They're definitely trying to

provide more service," said W. Myron Remington, manager of the engineering computer department at the Natural Gas Pipeline Co. of America in Lombard, Ill.

Remington said the uptick in service started when his company began moving to systems from Gateway 2000 Ltd. and that IBM did in general seem more hungry than in the past.

The new center has led to widespread speculation that it is the beginning of the company's move to direct-mail sales for some of its product line.

IBM, while not ruling out eventual direct sales at the Atlanta center, said that was not the immediate intent of HelpCenter.

The Armonk, N.Y.-based computer giant has seen its worldwide market share slip from 37% in 1984 to today's low of 13%.

The company's continuing struggle to regain the dominant position it once held has been exacerbated by such business woes as its first-ever quarterly loss and a slippage from its prized Moody's Investors Service, Inc. triple A bond rating.

Senior writer Michael Fitzgerald contributed to this report.

Windows 3.1 ready to roll, and users are optimistic

CONTINUED FROM PAGE 1

bed, in addition to their own testing, before buying in.

"This is going to be one of those products that I'll wait a couple of months on," said an executive at a Fortune 50 financial services firm. He said that some incompatibilities with Windows 3.0 applications had surfaced while his company beta-tested Windows 3.1, and he wanted to wait for potential problems to be fixed before diving headlong into

the new product.

Other users said they are ready to climb aboard the Windows 3.1 boat immediately. "We've already ordered our upgrades," said Robert Fulton, vice president at PHH Fantus, a management consulting firm in Overland Park, Kan., with more than 600 Windows users. He described the Windows 3.1 announcement as "great news" but said he wished Windows 3.0

had been everything Windows 3.1 is supposed to be.

According to Larry Winn, applications development manager at Georgia Power Co. in Atlanta, Windows 3.1 does meet both Microsoft's goals and his needs. "I think [Microsoft] did a very good job. It's a lot more stable," he said. Among the features Winn noted were improved network awareness and performance, a tremendous reduction in unexpected application errors and the ability to reboot an individual session in Windows without rebooting the entire system, a major complaint about Windows 3.0.

Windows 3.1 is the result of one of the largest beta-test pro-

grams in history — some 15,000 users worldwide, according to Microsoft Chairman and Chief Executive Officer Bill Gates. And it will be followed by one of the largest marketing campaigns (see story at right). The timing of the announcement may also serve to draw some attention away from IBM's upcoming OS/2 2.0 announcement, due at the end of the month.

Little of IBM's marketing strategy for OS/2 has been revealed (see story at left), but some reports indicated that an

WHAT BEGAN as a bug fix became a major release after Microsoft approached early Windows 3.0 users and found "a much bigger product than we had predicted," according to Richard Tong, senior product manager.

April 7 Comdex/Spring '92 unveiling is in the works. This is unusual treatment for what was initially described as a minor upgrade slated for release in mid-1991.

But what began as a bug fix became a major release after Microsoft approached early Windows 3.0 users and found "a much bigger product than we had predicted," according to Richard Tong, senior product manager for Windows.

The "3.1, to [Microsoft], is an important product that will continue the bandwagon they've created on Windows as a mainstream PC environment," said Bill Higgs, vice president of software research at Computer Intelligence/Infocorp in Santa Clara, Calif.

Current Windows 3.0 users are being offered an upgrade price of \$49.99. Retail pricing for the full product was not announced.

Microsoft grabs early lead

Microsoft jumped into an early lead in the marketing derby against IBM's OS/2 last week with its preannouncement of Windows 3.1. While its blast of publicity does not guarantee it customers, Microsoft's hoopla left IBM appearing flat-footed in comparison.

On technical merit, the two companies' operating environments — both scheduled for delivery within the next three weeks — are not even in the same category. IBM's OS/2 2.0 is a 32-bit platform designed to run DOS, Windows and 32-bit OS/2 applications, while Windows 3.1 is an enhanced version of the 16-bit Windows environment with some 32-bit extensions. But some analysts suggest that technical superiority offers no guarantees.

"Microsoft is putting a great deal of resources into advertising what is otherwise a minor upgrade," said Bill Higgs, vice president of software research at Computer Intelligence/Infocorp in Santa Clara, Calif.

"This can make a lot of competitive sense; [by] doing it at the same time [that] IBM is set to deliver 2.0," Higgs added.

IBM elected to stick to its game plan and not fight back last week when Microsoft ran rings around it (see story at right).

"If Microsoft steals the show, IBM should be shot because [Windows 3.1] is not that big of a deal, relative to 3.0," said Scott Stein, director of PC research at Technology Investment Strategies Corp. in Framingham, Mass. "It's still a DOS product, and OS/2 is not."

IBM has been promising a big push for its

OS/2 launch and has maintained that it will not release pricing or marketing plans until the product ships. Last week, IBM repeated its intention to proceed with this schedule, which includes an official debut at Comdex/Spring '92 in April.

"It could cause a lot of problems" for IBM, Stein said of Microsoft's marketing blitz. "The whole trick of this thing working is the marketability. It had nothing to do with the technical aspects. Everyone knows it's a nice platform."

Unless they are listening to Microsoft Chairman and CEO Bill Gates: When asked during last week's teleconference about OS/2 2.0, Gates answered, "We haven't seen the final product, but early indications are they may have promised more than they deliver."

IBM responded to the Microsoft positioning last week by saying it will deliver what it promised.

"We are confident that we will run what we said we will run" on OS/2, said Lucy Baney, director of programming systems market development. "I feel very confident about this. Our customers feel confident about it."

One OS/2 customer came to IBM's defense and said he was glad the company was not embroiled in a publicity battle with Microsoft. "I don't think it makes [Microsoft] look very professional," said Cary Serif, manager of applied technology at Huntington Bancshares, Inc. in Columbus, Ohio. "If IBM did that, it would put them into the same pot. You have to ask yourself, 'Do you want to deal with a group that takes that approach?'"

ROSEMARY HAMILTON

They're off

I hope it doesn't get too hypey," Richard Tong said last week after Microsoft Chairman and CEO Bill Gates' announcement that Windows 3.1 was ready to ship. The wish was probably in vain.

Microsoft said it is prepared to ship approximately 1.25 million copies of Windows 3.1, beginning on April 6 with Gates' official product introduction at Windows World in Chicago.

Copies of the product are already being shipped to Fedex warehouses around the country. The goal, according to Microsoft, is to have the product on store shelves the day it is unveiled.

Here are some of additional Windows 3.1 statistics:

- More than 8 million disks will be processed for the first month's shipments.
- Nine Microsoft manufacturing plants worldwide are producing Windows 3.1 disks, working three shifts per day.
- More than 100 tractor trailer loads of Windows 3.1 are being prepared for shipment to resellers.
- The software will be released in six other languages simultaneously with the English version.
- Microsoft will hold Windows 3.1 workshops in some 100 cities in April.
- Microsoft will begin its first television campaign ever.

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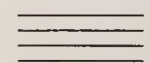
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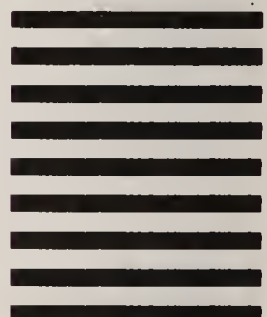
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Apple gives in to Windows drive, introduces laser printer, scanner

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. has finally taken to heart the old saying: If you can't beat 'em, join 'em. Today, the company is expected to unveil a laser printer and scanner designed for Microsoft Corp.'s Windows platform.

The introduction of the Personal Laserwriter NTR and the Onescanner for Windows — both slightly tweaked versions of existing products for the Macin-

tosh line — continues Apple's move to dismantle its proprietary past. "We're in the PC business and no longer just the Mac business," said Apple Chairman John Sculley.

While the sight of Apple product boxes bearing the "Windows-ready" logo may be disconcerting to longtime Macintosh users, the offerings are important for Apple, which must stem the flow of developers who have begun channeling their research dollars into the potentially more lucrative Windows market.

The Windows 3.0 interface, which offers more than 60 million DOS users many of the graphical ease-of-use characteristics that were once available exclusively on the Macintosh, has sold more than 10 million copies since its May 1990 debut, Microsoft said. Last week, Microsoft also announced its long-awaited update, Windows 3.1, which will be available next month (see story page 1).

Apple faces a tough battle against established competitors such as Hewlett-Packard Co., analysts said. So far, the company has been very successful in the imaging market, which now accounts for more than \$1 billion in annual revenue. Sculley projected that the firm could secure 25% of the scanner

market with the introductions. He made no similar forecast for the printer market.

"Apple has done very well selling its own printers, but I think they'll find the playing field a bit tougher in the DOS and Windows market. It will be much more difficult to establish a beachhead," said Kevin McCarthy, an analyst at Mabon Securities Corp. in New York.

The Personal Laserwriter NTR and the Onescanner for Windows will be available in April.

The scanner comes bundled with the Ofoto image scanning software from Light Source, Inc. Ofoto streamlines the scanning process through a one-step procedure that calibrates the resolution and scans the image to be reproduced.



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Apple to show integration plan

BY JAMES DALY
CW STAFF

Apple Computer, Inc. Macintosh users engaged in the difficult job of building complex client/server systems can expect good news this week when Apple unveils the first installment of a key internal blueprint for implementing the Macintosh in a variety of mixed hardware and software configurations.

The plan, the first 1,000 pages of which will be unveiled at this week's DB/Expo '92 in San Francisco, is called Virtually Integrated Technical Architecture Lifecycle (VITAL) and summates the collective experience of Apple integrators. Users have long clamored to use VITAL as an integral strategic planning tool in order to better understand the hardware, software and associated support required in a client/server approach.

"We'd be very interested in anything that can save us a struggle or point us in the right direction when we're in the middle of a problem," said Chad Piedmont, an application developer at Eastman Kodak Co. in Rochester, N.Y.

Apple sources said VITAL suggests replacing the traditional host-down method of integrating disparate networking architectures. Rather, it says that the differences in dissimilar systems can be bridged at the desktop if application developers write to Apple's Integration Services application programming interfaces (API).

Apple already offers some of these Integration Services in its Data Access Language and Data Access Manager.

Sources briefed by Apple also said Apple will port the Integration Services, as well as other Macintosh functionality, to other desktop operating systems in the future. Apple's latest strategy for System 7.0's evolution involves snap-on extensions wherein users and developers can choose to either add or ignore advanced functions.

At a recent briefing on the direction of System 7.0, Apple officials described upcoming extensions such as the Open Collaboration Environment, which will feature a set of APIs with which developers can link disparate applications.

Apple plans to release the full text of VITAL in installments throughout the year. Apple is also expected to offer training courses related to VITAL's concepts.

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Firm offers modular approach, adds applications to Spectrum family

BY ELISABETH HORWITT
CW STAFF

ROCHESTER, N.H. — Cabletron Systems, Inc. is expected this week to address two long-standing drawbacks to its integrated network management system: its \$50,000-plus price

which allow the system to manage a particular SNMP-compliant network device at a cost of between \$1,000 and \$3,000, Mellinger said.

The starting price should appeal to a number of users who have been put off by the \$50,000 price tag of the current "kitchen

proximately \$74 million in 1991 to just over \$325 million in 1996, according to Frost & Sullivan International in New York.

A Cabletron spokesman confirmed that the vendor will be announcing a modular Spectrum Version 1.1 next week.

Shearson Lehman Brothers, Inc., a current Spectrum user, hopes that the lower-priced, modular version will save it money on upgrades, said Victor Duchovni, a senior systems analyst at the investment firm.

Inviting third parties

Cabletron will also begin filling in the application gap next week, announcing that five third-party programs will be integrated with Spectrum: Remedy Corp. (trouble ticketing); Isicad, Inc. (a graphics-based package that tracks the physical layout of network devices); Make Systems, Inc. (network capacity planning); and SAS Institute, Inc. (database and report generation).

Shearson Lehman is planning to integrate Isicad's package with Spectrum to track some 1,200 workstations on the network, Duchovni said.

The applications support should expand Spectrum's appeal to a much broader audience, said Jill Huntington-Lee, a principal at Brandywine Network Associates, a Cinnaminson, N.J.-based consultancy.

Cabletron is also expected to announce that Spectrum Version 1.1 will be able to manage

products from 20 network vendors, including Banyan Systems, Inc., Coral Network Corp., BT North America, Inc. and David Systems, Inc.

Cabletron will also announce two tool kits designed to expand the range of networking systems that Spectrum can manage, Mel-

linger said. The Level 1 tool kit (\$12,000) enables users to customize how the system manages SNMP-compliant devices.

The Level 2 tool kit, priced at \$15,000, allows the user to create "entirely new management modules not based on SNMP," Mellinger said.

Ring out the old

Comparing releases of Cabletron Spectrum alternatives:

- Spectrum 'kitchen sink' Version 1.0: GUI, SNMP-based management of a range of hubs, routers and LAN devices. **Price: \$50,000 and up.**
- Spectrum 'modular' Version 1.1: Base system, GUI, management server, SNMP module. **Price: about \$18,000.** Optional SNMP management information bases to manage specific network devices, including:
 - BT North America packet switches.
 - Wellfleet routers.
 - Banyan Vines networks.**Price: \$1,000 to \$3,000.**

tag and its lack of applications.

Cabletron's Spectrum Version 1.1 will be modular, with a base system consisting of the Spectragraph user interface, server and Simple Network Management Protocol (SNMP) interface, according to Ginny Mellinger, a senior analyst at International Data Corp. in Framingham, Mass. The base price will be about \$18,000, she said.

Users can add SNMP management information bases,

sink" version of Spectrum, analysts said. In contrast, competing products such as Sun Microsystems, Inc.'s SunNet Manager and Hewlett-Packard Co.'s OpenView start at \$3,000 and \$7,000, respectively.

With a commercial installation base of between 150 and 175 commercial sites, Spectrum still makes up a small percentage of the integrated network management market, analysts said. That market will grow from ap-

Elementary, my dear

Concord Communications, Inc. in Marlboro, Mass., is expected this week to enhance its Trakker local-area network monitoring system with a utility that answers network managers' questions of "whodunit" when a network problem emerges.

Concord's new Who Tool answers questions such as which

workstation or application is hogging a LAN server or cable segment and which router is sending packets to the wrong addresses. It does this by replaying network events from Trakker's database, which is said to store 4,000 types of network variables.

While some LAN monitors, such as Network General Corp.'s Distributed Sniffer, can monitor a variety of network variables over time, Trakker "is



a lot more usable by your basic, nonexpert operator," said Jill Huntington-Lee, a principal at Cinnaminson, N.J.-based consulting firm Brandywine Network Associates. Concord's "correlational software" automatically traces alarms and suspicious events to their source and presents the results of its investigation in a form that a nontechnical user can readily understand, she added.

Prior to installing Who Tool, "I would see X amount of AppleTalk traffic or a broadcast storm on the network but not know who was generating it," said Lynda Rudolph, a manager of radiology information systems at Brigham & Women's Hospital in Boston. "Now I can just click on Who Tool and find out."

Who Tool is available immediately as a standard feature of Trakker.

ELISABETH HORWITT

Bell Atlantic number links mobile exchanges

BY ELLIS BOOKER
CW STAFF

Bell Atlantic Mobile Systems said last week it would soon introduce a service that enables subscribers to designate a single number for their home and office telephone, as well as their cellular phone, fax machine, pager and voice mailbox.

Subscribers will be able to direct calls to different locations based on preferences such as time of day. Voice recognition of spoken passwords may be added to allow subscribers to access voice mail, for example, the company said.

Bell Atlantic said it initially plans to roll out the \$15 to \$25 per month service, which has yet to be named, in late June to its cellular phone customers in Baltimore and Washington, D.C.

Bellevue, Wash.-based Access Plus Communications, Inc.

developed the core technology behind the one-number service.

Already, some cellular subscribers of McCaw Cellular Communications, Inc. in Seattle, which has also deployed the Accessline system, are using one-number services.

In addition to the Bell Atlantic cellular unit, three Canadian phone companies said their customers would try Accessline. The Canadian companies are AGT, the regional telephone company for the province of Alberta; Ed-Tel in Edmonton, Alberta; and SakTel, the regional telephone company for the province of Saskatchewan.

Callers who dial a uniform number are greeted with a voice-response system that tells them which numbers on their phones to push in order to be connected to the called party's various business, home, fax and voice-mail extensions.

Boeing picks SunNet Manager as standard

BY MARYFRAN JOHNSON
CW STAFF

SEATTLE — The Boeing Co. will announce this week that it has chosen a standard for its nationwide network management: SunNet Manager from SunConnect, a subsidiary of Sun Microsystems, Inc.

As the current and future platform for Boeing's massive local-area network/Internet network management environment, Sun is jointly developing configuration management functions for Boeing that will expand its present role in managing the aerospace giant's router-based network.

Some of the results of that collaboration will show up in the next release of SunNet Manager, which is used at Boeing for fault and performance management of the firm's network, said Dean Coons, group manager for Boeing Computer Services' network information systems.

Boeing evaluated every network management product on

the market before settling on Sun, Coons said. The search focused primarily on features available today, plus evidence of firm commitment to future enhancements. "We're tired of waiting for things to happen," he said. "Too many times, you sit and wait for things that never come about."

Any protocol will do

SunNet Manager, which lists for \$3,000, is a protocol-independent, integrated platform for heterogeneous network management. It supports Simple Network Management Protocol (SNMP) but also has extensions through third-party products for other network protocols.

In the nearly three years since its debut, SunNet Manager has grown to an installed base of 3,000 licenses, according to Sun.

It has also attracted numerous third-party vendors as partners and held a leading position as a vendor-neutral SNMP management platform, said Dave Passmore, an analyst at Ernst &

Young's Network Strategies Division in Fairfax, Va. "That's been changing, however, as [Hewlett-Packard Co.'s] OpenView has gained real industry momentum," he added. "HP and Sun are arch-competitors here."

Unlike Sun's product, HP's OpenView is strongly endorsed by IBM and also includes a large portion of the Open Software Foundation's Distributed Management Environment (DME), an emerging industry standard.

However, Sun does not plan to be left standing on the other side of the DME fence, said Dennis Yaro, director of network management product development at SunConnect. "We are definitely not setting up an us-and-them situation," he said. "Interacting with DME is in our plan."

From Boeing's point of view, Sun support for DME could become a crucial part of keeping the customer satisfied, Coons said. "If the industry goes one way and Sun is not with them, they will lose market share."



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Ontos CEO rejoins Lotus as marketing executive

BY ROSEMARY HAMILTON
CW STAFF

CAMBRIDGE, Mass. — Frank Ingari, a former Lotus Development Corp. executive, will return to the software company today as vice president of marketing.

Ingari said he left Lotus in early 1991 "frustrated and angry" with the management team of Jim Manzi and Frank King. King, who had been chief technology officer, left in late 1991. Ingari went on to serve as chief executive officer at Ontos, Inc., a maker of object-oriented database management systems.

Since his departure, Ingari said he "watched Jim Manzi correct those things" that had disturbed him enough to "take the call from the headhunter." While

he said he did not want to personalize the issues, he felt "the management team was not a team at the very top."

Problems aplenty

Lotus, Ingari said, had a long list of problems. The management team had "too much energy focused on themselves, the politics and who was going to get the next job instead of the technology, the customers and the industry," he said.

There was little coordination between marketing and sales, which Manzi fixed by bringing in Robert Weiler to oversee both functions, Ingari said.

On the development side, Ingari said, he worked with many "wonderful people," but "it wasn't clear that we had a unifying vision that drove everyone."

The addition of John Landry has brought more focus to the development effort, he added.

Weiler is now senior vice president of Lotus' North American business group. Landry replaced King as chief technology officer.

Ingari had held various executive positions at Lotus, including marketing and development jobs. Vice president of marketing is a new slot at Lotus and should help convey more consistent messages from the marketing and communications groups at the company, he said.

Under King, Ingari had lost some of his responsibilities for spreadsheets and been given an assignment in Lotus' emerging technologies sector, which he said was a "parking lot assignment."

Ingari will remain on the board at Ontos and said he is still a champion of the company's object-oriented technology. Jim Cannon, vice president of sales and marketing at Ontos, will assume the role of CEO.

Ameritech CIO shifts role

Will head commercial information systems unit

BY ELLIS BOOKER
CW STAFF

CHICAGO — Ameritech Corp.'s chief information officer put on a vendor hat last week, leaving his job as head of one of the Midwest's largest information systems departments to join the Ameritech unit that sells IS to commercial customers.

"The appeal of the job is that I've been a CIO for Ameritech... and now I'm selling to CIOs," said Glen Arnold, who was recently named vice president and chief operating officer at Ameritech Information Systems (AIS).

Arnold's shift is reflective of moves made recently by other CIOs, such as Eastman Kodak Co.'s Katherine Hudson, who have opted to run line businesses rather than chart IS strategy.

Based in Chicago with a staff

of some 2,000 people spread throughout Ameritech's five-state region, AIS sells IS, telephone systems and computer equipment to Ameritech's major business customers.

As vice president of information technology at Ameritech Services, Arnold was responsible for an IS group of 4,000 people and 11 data centers. His plan to consolidate to four data centers there is well under way, and Ameritech will have nine facilities by the middle of this year.

Before joining Ameritech's IS group 3½ years ago, Arnold was a vice president of marketing at Wisconsin Bell, Inc., one of Ameritech's telephone companies. Before joining the regional Bell holding company in 1985, Arnold worked in sales and marketing at IBM.

Replacing Arnold at Ameritech Services is Mike Friduss.

Au Bon Pain accents client/server

CONTINUED FROM PAGE 1

operations, profits, losses, marketing analytics and trends. Store managers get their copies early Tuesday morning.

"It has changed our business," said Ronald Shaick, co-chairman and chief executive officer of the \$68 million retail food business. "Every manager and executive in the company gets everything they need to know in that one report, and that's hugely powerful."

The Retail Operations Report software runs on a single Sun Microsystems, Inc. SPARCstation 2 workstation and Oracle Corp. database, which each night relies on a Unix-based PC to poll a network of 75 NCR Corp. PCs in the restaurants and gather information used in constructing the report. Au Bon Pain designed the software in conjunction with

Cambridge, Mass.-based Sapiant Computing Corp., creating 30,000 lines of code during the past five months.

Similar software projects cost about \$250,000, but the consultants said Au Bon Pain negotiated "a much better deal."

The combination of store-based PC processing with Unix-based corporate systems has produced a powerful but cost-effective way to leverage and distribute crucial information.

With a glance at the weekly report, for example, store managers can see if their food costs are in balance with actual sales figures. The report is continually updated with accurate information from accounting and payroll as well.

"We've been able to track down people giving away food

over the counter without charging for it," Factor said. "Now we can catch that kind of thing at the end of a week rather than the end of a month."

Each restaurant's controllable profit can be affected by everything from the amount of dough used to bake bread to the number of employees scheduled to work during peak hours. "They've got to be able to plug the leaks from the bottom line," Factor noted.

The 10-year-old restaurant chain includes 75 full-service cafes, 10 express cafeteria-style operations and 22 franchised stores. "All the real action is out in our stores, and we are leveraging our PC investment by putting the [initial] processing out there," said Factor, who joined Au Bon Pain three years ago.

He said other restaurant chains, such as Mrs. Field's, Inc., have spent up to \$30,000 per store to set up host-based networks, whereas Au Bon Pain spent only \$6,000 per store. The corporate end of the system costs about \$35,000 for the Sun workstation, an eight-node Ethernet network and other PC hardware.

In the restaurants, the cash registers are linked to the PCs, which automatically draw in the day's sales and crunch the numbers through a customized application called Assisting Managers In Getting Out or AMIGO. Be-



Mark Alcares

Au Bon Pain's Factor: The new client/server system provides everything in one report

cording to Factor.

Yet the advent of the store systems only multiplied the information-tracking problems back at headquarters as the data ended up in "literally 20 different places," Factor said.

That is where the Unix-based corporate system stepped in, drawing the store-processed data into the Oracle database on the Sun machine, which passes the final figures to another pair of Intel Corp. I486-based PCs running a Lotus Development Corp. report writer program. The report writer formats and produces the Retail Operations Reports.

An older NCR Tower machine runs the company's financial data, but the strategic sales and operations system was purposefully built on the Sun and PC network instead.

Info by the slice

With its restaurant and corporate systems up and running now, Au Bon Pain's next step is building a corporate network that gives users a kind of "slice and dice" viewing ability for business data.

"We have a ton of information in our Retail Operations Report, but now we want to give people access from a modeling perspective," said Mark Factor, MIS director.

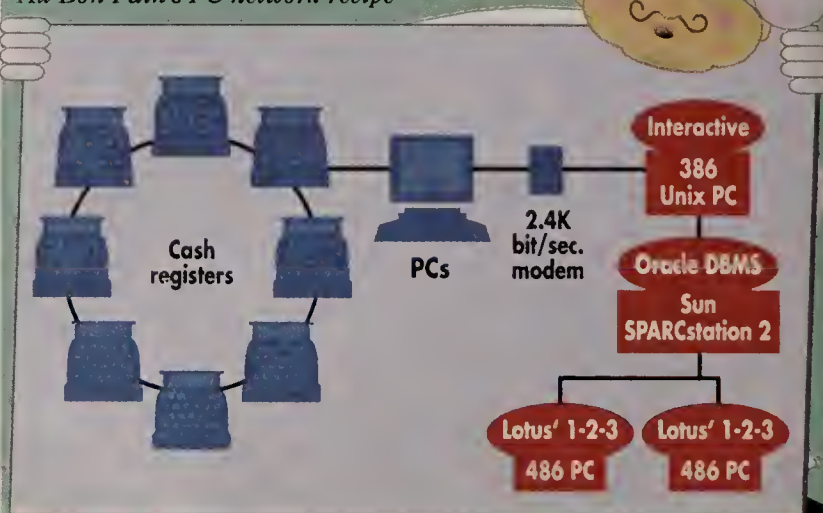
So, developing a "product mix analysis" software package is next on Factor's agenda. "We may have a limited menu, but our product line covers more than 300 separate items — everything from small, medium and large drinks to add-on cheese," he explained. "We want managers to be able to look at things like the effect of Coffee Connection coffee on the sale of baked goods, for example."

The company plans to purchase a separate network server in 1993 to expand its Ethernet-based local-area network into a Transmission Control Protocol/Internet Protocol network.

MARYFRAN JOHNSON

Fresh-baked data

Au Bon Pain's PC network recipe



Source: Au Bon Pain

CW Chart: Michael Siggins

Unisys eyes 2nd straight period in black

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — Calling it a "significant milestone in our recovery," Unisys Corp. Chief Executive Officer James A. Unruh predicted his company would show a profit in the first quarter, which ends March 31.

During the same period a year ago, Unisys lost \$98 million. Its first profitable quarter in seven periods came in the fourth quarter of 1991, when it posted a net income of \$80.5 million.

Unruh did not predict the size of this

second-quarter-in-a-row profit, however.

Financial analysts calculated the positive result in the first quarter would be modest and said back-to-back quarterly profits, while not ultimate proof of a Unisys turnaround, could be taken as a sign that the company's cost-cutting strategy is working.

"At the end of '91, they were 10% ahead of the cost-cutting plan," said Sam DeRosa-Farag, an analyst at First Boston Corp. in New York.

"The question now is, what's their ability to generate cash to pay down their debt?" DeRosa-Farag said.

Robert Kidd, a senior industry analyst at Dataquest, Inc. in San Jose, Calif., said a first-quarter profit would reflect sales of recently introduced high-end members of Unisys' 2200 and A series mainframe lines.

Not much room to grow

However, Kidd noted that sales into Unisys' installed mainframe base represented a limited market opportunity.

When it reported its positive 1991 fourth-quarter result, Unisys stated its expectation for a year-end profit in 1992. At a conference last week, Unruh said he

stood by that forecast.

Speaking before the New York Society of Security Analysts, Unruh said his company would continue to pursue a number of fronts:

- The Unisys architecture outlined in 1990, which calls for open hardware and systems surrounding some Unisys proprietary technologies.
- Alliances with systems integrators, consulting firms and chip makers such as Intel Corp. and Motorola, Inc.
- An emphasis on the financial, airline, communications carrier and government markets, which together represent more than 70% of its business.
- Revenue from value-added services such as strategic consulting, systems integration and outsourcing.

DOE to share technology

WASHINGTON, D.C. — Twelve large computer firms and the U.S. Department of Energy struck a deal last week intended to encourage the transfer of advanced technology from nuclear weapons programs to the commercial sector.

The Computer Systems Policy Project (CSPP), an affiliation of chief executives from major U.S. computer firms including IBM, Digital Equipment Corp., Apple Computer, Inc. and Sun Microsystems, Inc., capped a two-year effort by getting the Energy Department to agree to a greatly streamlined procedure for establishing technology-sharing agreements between computer companies and the department's national laboratories.

Kenneth Kay, CSPP's executive director, said the agreement should reduce the time it takes to set up such collaborative efforts. "The significance of this is that a huge barrier to potential interaction between the industry and the labs has been knocked down," Kay said.

GARY H. ANTHERS

Dataware merging with Reference

CAMBRIDGE, Mass. — Compact disc/read-only memory (CD-ROM) manufacturers Dataware Technologies, Inc. and Boulder, Colo.-based Reference Technology, Inc. last week disclosed their intention to merge.

"Dataware has been a company focused on products, and Reference has been a company focused on services," Dataware President Kurt Mueller said. The merger will allow the new company to have a stronger presence in both areas. The combination will have sales in excess of \$12 million this year, Mueller said.

The combined firm will use the Dataware name and continue to be based here, while Reference Technology's former base will be used as a sales, service and support center.

More than 300 CD-ROM titles have been produced by clients of the two firms, which include commercial publishing, corporate and government organizations. Mueller indicated that the nearest competitor produced approximately 75 titles.

CHRISTOPHER LINDQUIST

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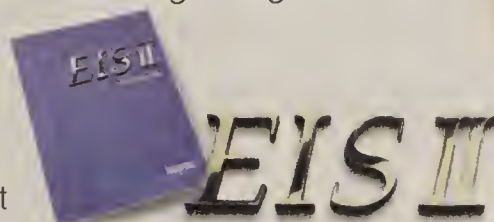
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Apple ups infringement claim

Microsoft Corp. disclosed last week that Apple Computer, Inc. has upped the ante in its high-stakes copyright infringement suit and will seek \$5.55 billion in damages. The amount, which was made known during the discovery phase of the *Apple v. Microsoft and Hewlett-Packard Co.* lawsuit, reflects the opinion of an expert witness expected to testify on Apple's behalf. Last month, Apple said it would seek \$4.37 billion in damages resultant from lost profits.

HP builds its own chip consortium

Intent on attracting more software developers and building up multiple distribution channels for its Precision Architecture-RISC chip, HP will announce its own consortium in New York tomorrow. Industry analysts are expecting the roster of a dozen member companies to include Convex Computer Corp., Prime Computer, Inc., Hitachi Data Systems Corp. and other Asian computer vendors.

AMS barred from federal contracts

American Management Systems, Inc. in Arlington, Va., last week was barred by the U.S. Environmental Protection Agency from receiving federal contracts because of its alleged involvement in an improper hiring scheme. The EPA said its own officials specified to AMS a group of individuals whom the EPA wished to hire. AMS then employed them as "subcontractors" to perform work for the EPA, and "in many cases," the EPA alleged, the employees did not perform the work for which the EPA was billed.

Oracle for NetWare to get upgrade

Oracle Corp. in Redwood City, Calif., will announce enhancements this week to its year-old Oracle relational database server for Novell, Inc. local-area networks. The new product, Oracle Server for NetWare Version 1.1, will boost transaction processing speeds and add greater connectivity to other Oracle database servers using Oracle's SQLnet and adding support for Transmission Control Protocol/Internet Protocol.

Unisys settles shareholder suits

Unisys Corp. said it has reached a global settlement covering all remaining shareholder lawsuits related to government investigation of Unisys financial disclosures for 1989 and 1990, the so-called "Ill Wind" investigation. The settlement, which is subject to court approval, will affect 17 outstanding lawsuits and cost Unisys roughly \$18 million. However, the company said the costs would not be material to its financial condition.

Short takes

Lotus Development Corp. opened up shop in Moscow last week and introduced a Russian version of its 1-2-3 for DOS spreadsheet, priced at about \$85. . . . **Legent Corp.** has acquired rights to a remote print distribution software product from CMA Software A/S in Copenhagen. . . . **Xerox Corp.** has introduced software that lets a user issue commands to a personal computer by writing them on paper and then faxing them to the PC. . . . The Internal Revenue Service last week reaffirmed a \$1.4 billion award to **AT&T** for computer equipment and services to support tax systems modernization. . . . **Next Computer, Inc.** named Peter van Cuylenburg as president and chief operating officer. The 43-year-old executive is a veteran of Mercury Communications in the UK and Texas Instruments, Inc. . . . **Microsoft Corp.** has named Patty Stonesifer to the position of vice president of product support. Stonesifer was previously general manager of Microsoft press and headed up the company's Canadian operations. . . . Six Japanese sites, including corporations and research institutions, recently installed **NCube Corp.**'s **NCube 2** massively parallel supercomputer systems. . . . **Pennant Systems** has announced **Print Services Facility/2**, host printing software for LANs that allows users to take applications developed for an IBM host printer and print them on workstation printers made by IBM and other companies.

NCR unveils trendy notebook

BY MICHAEL FITZGERALD
CW STAFF

DAYTON, Ohio — As expected, NCR Corp.'s notebook business unit released a notebook that offers cutting-edge communications and a variety of advanced features that could prompt some users to use the machine in place of desktop computers.

With the System 3170's communications capabilities, users can send and receive faxes and messages without using telephone lines. The notebook comes bundled with a fax/modem and can use wireless communications, such as cellular phones, alphanumeric pagers and radio frequency.

In a demonstration by NCR, the 3170 failed to connect via cellular modem to a fax in the same Boston-area building but was able to trade electronic-mail notes with a worker in an AT&T office in New Jersey by using an RF modem that comes as an option. A notice that the NCR cel-

lular carrier was not recognized by the local cellular carrier could be heard over the modem.

NCR said users of the system might run into similar problems, but the basic design will allow them to connect with remote computer systems from virtually any environment.

Not for everyone

"It's almost like a sports car," said Bruce Stephen, director of personal computer hardware and pricing research at International Data Corp. in Framingham, Mass. "This is definitely not aimed at the masses."

The 3170 runs on an Intel Corp. 25-MHz 80386SL processor, weighs 4.9 pounds and, in its \$5,399 base format, has 2M bytes of random-access memory, a 2.4K/9.6K bit/sec. data/fax modem and an 80M-byte hard drive. A separate unit with 4M bytes of RAM, a 120M-byte hard drive and a 14.4K/9.6K bit/sec. data/fax modem is also available. It maintains the distinctive

styling of the Safari laptop and adds a FingerMouse device on the keyboard. Battery life is estimated at three hours.

It may be the first system in the U.S. that has a Personal Computer Memory Card International Association memory card to complement a 1.44M-byte floppy drive. Microsoft Corp.'s Windows 3.1 will ship standard and preloaded with the 3170, as will BitFax 2.0/SR fax software. An optional docking station is offered with a choice of 3½-in., compact disc/read-only memory drive and RF modem kit. These features are giving users reason to consider using the system as a desktop replacement [CW, Feb 10.]

Edward Cote, now director of marketing and product line management for the 3170, said the only thing NCR contributed to the new notebook was the name because the project was well into its development cycle before the AT&T purchase of NCR was completed.

Latest IBM notebooks to take low-cost road

CONTINUED FROM PAGE 1

"If \$3,250 is list, the [51SLC] is priced very competitively, and we could go for something like that," said Robert McLoughlin, assistant vice president of microcomputer procurement at New York Life Insurance Co. However, he said, the SX-based machine is not powerful enough to interest his users.

"It sounds as if they're going in to compete with the Tandys and Dells. This is far from the typical IBM approach," said Claude Rankin, a consultant and former MIS director at Deloitte & Touche's New York office. Rankin added that the N51SX's low price would likely give it appeal outside of IBM shops.

Still, the me-too N51SX lags

behind IBM's competitors by more than a year, and the N51SLC, which analysts said stacks up nicely against the new Compaq Computer Corp. LTE Lites with Intel's 20- and 25-MHz SL processors, may not draw the respect it might have if IBM had released it earlier.

However, where the current IBM laptop, the L40SX, has sold primarily into accounts that bleed Blue, analysts said they think the two notebooks might appeal to outside accounts as well because of their pricing.

"Given the pricing, yes, [IBM] does have a chance to gain some share," said John Dunkle, vice president of Workgroup Technologies, Inc., located in

Hampton, N.H.

One user considering buying low-end, low-cost notebooks said she would add IBM to her list.

"I grew up on IBM and Compaq, and I'm inclined to go that route," said Christine A. Sikes, director of accounting/MIS at McGregor Travel, Inc. in Stamford, Conn. Sikes said Dell Computer Corp. and CompuAdd Corp. have since become her first choices because of corporate policy.

IBM's color portable, which will feature an 11- by 13-in. active-matrix display, is due next month. Pricing is expected to be \$5,995.

One major laptop user pointed out that NEC Technologies, Inc.'s new Ultralite 25C weighs 7 pounds, is a true notebook, has a longer battery life and costs the same, while Toshiba America Information Systems, Inc.'s T4400SC notebook, expected to be announced early next month, will offer an Intel i486 chip with an active-matrix color screen and three hours of battery life for the same price, according to briefed sources.

A source close to IBM said the firm intends to market color portables as desktop machines that can be moved around.

Sources indicated these new products would have no impact on IBM's pending agreement to resell relabeled notebooks made by Zenith Data Systems. One said Zenith Data's SL-based notebooks would be a nice fill-in to IBM's family of notebooks.

IBM is expected to release at least three more portable systems this year, including a pen-based system.

Starting over

Two of the key products in IBM's renewed portable assault

	Model 51SX	Model N51SLC
CPU	16-MHz 386SX	16-MHz 386SLC
Memory	2M bytes, expandable to 10M bytes	2M bytes, expandable to 10M bytes
Mass storage	40M-byte drive	80M-byte drive
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scale display (Sun only offers a 17" monochrome display on the ELC). And, with over 1,800 applications already available, you're ready to get up and running fast.

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Novell expected to detail distributed mail plan

CONTINUED FROM PAGE 1

cations programmer. Banyan, however, would not confirm such a strategy.

Novell has previously dug in to the server-reduction challenge with database and enterprise network management modules for NetWare servers [CW, Feb. 3].

To tackle messaging, according to Heckman, a forthcoming NetWare Loadable Module (NLM) will link disparate local-area network client platforms running Unix-oriented Simple Mail Transfer Protocol, IBM's Systems Network Architecture Distribution Services, X.400 and Novell's Message Handling System

transport engines (see diagram below right).

The NLM is expected to ship later this year, according to Patrick Corrigan, principal at The Corrigan Group, a consulting firm in Sausalito, Calif.

Whole kit and caboodle

Heckman also confirmed that Novell will support the range of competing application programming interfaces (API) under construction, including Vendor Independent Messaging, Microsoft Corp.'s API, X.APIA and Apple Computer, Inc.'s Open Collaborative Environment as well as No-

vell's Standard Messaging Format.

Support of the multiple APIs means that applications written in accordance with any of them will be "capable of running over the Novell messaging NLM," Heckman explained.

That approach, along with support of the messaging APIs, should eventually preclude the need for users to run multiple mail servers on their LANs, said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

It is not uncommon for large companies to run two or three electronic-mail servers on each LAN because different

client platforms generally require different mail protocols, said Walter Ulrich, a director at Arthur D. Little, Inc. in Los Angeles. He estimated an average per-user price on each E-mail server to be \$50.

A LAN-based E-mail hub would also "eliminate E-mail format conversion in the data center," Ulrich added.

Any-to-any messaging conversion is usually done on host-based products such as SoftSwitch, Inc.'s mainframe gateway. With this scheme, disparate client platforms physically next to each other on a LAN often communicate with each other circuitously through a data center, Ulrich explained.

Therefore, Novell's modular strategy could be a "no-lose situation" for network managers, said Bill Cotter, vice president of international MIS at Warner Bros., Inc. in Burbank, Calif., which runs "one of everything" for E-mail servers.

According to Cotter, SoftSwitch's "messaging service is expensive and can be slow."

Apathy at GE

On the other hand, "So what?" is General Electric Co.'s Nuclear Energy's view of Novell's strategy.

Bob Carpenter, manager of computations and information systems at the San

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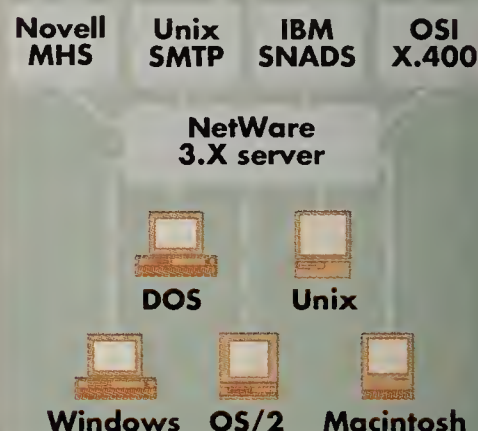
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Distributed doctrine

NetWare's global messaging is a key component of Novell's distributed computing strategy



Source: Gartner Group, Inc. CW Chart: Janell Genovese

Jose, Calif.-based firm, asserted that Novell LANs generally comprise fewer than 10 workstations and "don't need such sophisticated application servers. Large shops such as GE's have moved to Unix and do not use PCs as servers."


In addition, the universal server strategy might not appeal to users "hesitant to put everything in one place," said Michael M. Gansl, president of NetLAN, Inc., a Novell reseller in New York.

"If Novell sneezes, we all get colds," agreed colleague Marc Trachtenberg, NetLAN's director of technology.

However, Trachtenberg described Novell as a "fast-moving train driving the market" and said users sticking with the company are likely to be "very successful."

CLARIFICATION

The March 2 article on Microsoft Corp. electronic-mail glitches describing Ontario Hydro Research Division's problems with sending large E-mail files or widely distributing messages via Microsoft's software pertained only to the Microsoft Mail for Windows 2.1 client.



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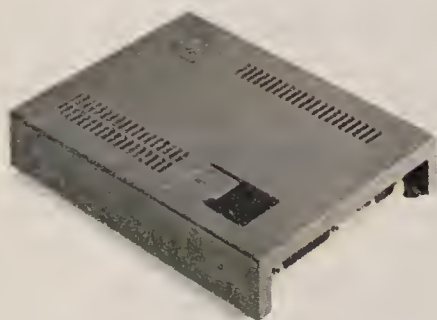
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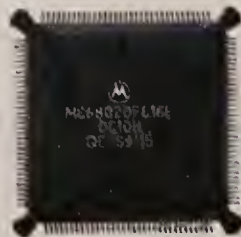


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PRINTERS. PAGES AHEAD.

DEC's mail-order plan convinces few

BY SALLY CUSACK
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. claimed last week that its personal computer shipments have quadrupled weekly since its mail-order initiative started eight weeks ago, but some large users and analysts remain skeptical of the program's ability to propel the company into the forefront of the microcomputer business.

One reason is this: DEC is dealing with a very low shipment rate to begin with, noted Frank Michnoff, program director

of desktop computing strategies at Meta Group, Inc., a Westport, Conn., market research firm.

"They might have shipped 125,000 PC units last year, so the improvement doesn't surprise me," Michnoff said. "They could easily double that."

Most observers said they see DEC's potential to increase PC revenue resting with its value-added resellers and its customer base.

Indeed, one reseller participating in the newly announced DEC Desktop Direct program reports success using DEC's mail-order services. David L. Kun-

kel, president of Eagle Computer Systems in Eagle, Colo., said that in addition to selling servers and software, Desktop Direct allows him to be more competitive with desktop products as well.

Strong support

A four-year DEC customer and Desktop Direct participant, Mike Luckenbach, supervisor of nuclear fuels manufacturing information systems at Asea Brown Boveri in Windsor, Conn., said DEC's service and support convinced him to purchase PCs, Ethernet cards, keyboards and monitors via the mail-order program

Billions away

With only \$500 million in PC revenue, DEC plays a small role in the market

	1991 worldwide PC revenue	Percent of market share
DEC	\$500M	1.2%
Tandy	\$810M	2.0%
Compaq	\$3.1B	7.8%
Apple	\$5.2B	13%
IBM	\$10.6B	26.5%
Total market: \$40B		

Source: Gartner Group, Inc. CW Chart: Janell Genovese

when it was announced.

Once outside the customer base, however, DEC may have to work harder to win a presence among traditional PC users. A DEC spokesman said the company has sent out "hundreds of thousands" of brochures detailing Desktop Direct. But non-DEC customers who were contacted last week had not heard a word.

"I'm so invested in Compaq right now, I would need an overwhelming reason to move to DEC," said Glenn W. Sandusky, chief information officer at Miller Mason and Dickenson, a benefits consulting firm in Chicago.

Sandusky said he was not familiar with DEC's Desktop Direct program. "People don't perceive DEC to be in this business — they never had any previous success," he said.

Clint Rickards, MIS consultant at Aetna Life and Casualty Co. in Hartford, Conn., said he is not familiar with DEC's new campaign. Aetna has installed both IBM Personal System/2s and Advanced Logic Research, Inc. clones.

Grid shows off strap-on micro

NEW YORK — Reality edged a step closer to science fiction last week with the introduction of Grid Systems Corp.'s wearable pen computer.

The Palmpad, a 2.8-pound machine that can be strapped to the user's wrist, worn on a belt or slung from a shoulder strap, has been ruggedized to fit the needs of data collection users who are constantly on the move, the company said.

Running on a 9.5-MHz NEC Corp. V.20 microprocessor, the Palmpad comes with MS-DOS 5.0, 2M bytes of random-access memory, a slot for high-capacity solid-state storage cards with up to 20M bytes of storage, batteries that run for up to eight hours and a 6.1/2-in. LCD. It lists for \$2,895 and is scheduled to be available next month.

Portia Isaacson, principal at Dream IT, Inc. in Cambridge, Mass., said she saw this offering as fitting into a niche she described as "industrial palm-size pen computers." Typical users would fit into a blue-collar worker mold. "This computer is Levi's, not Armani," she said.

Isaacson said the machine, which runs all the software that its predecessors run, is a good evolutionary step from previous products. She cited in particular the removable battery pack, which can be worn around the waist, thus dropping the weight on the wrist by three-fifths of a pound.

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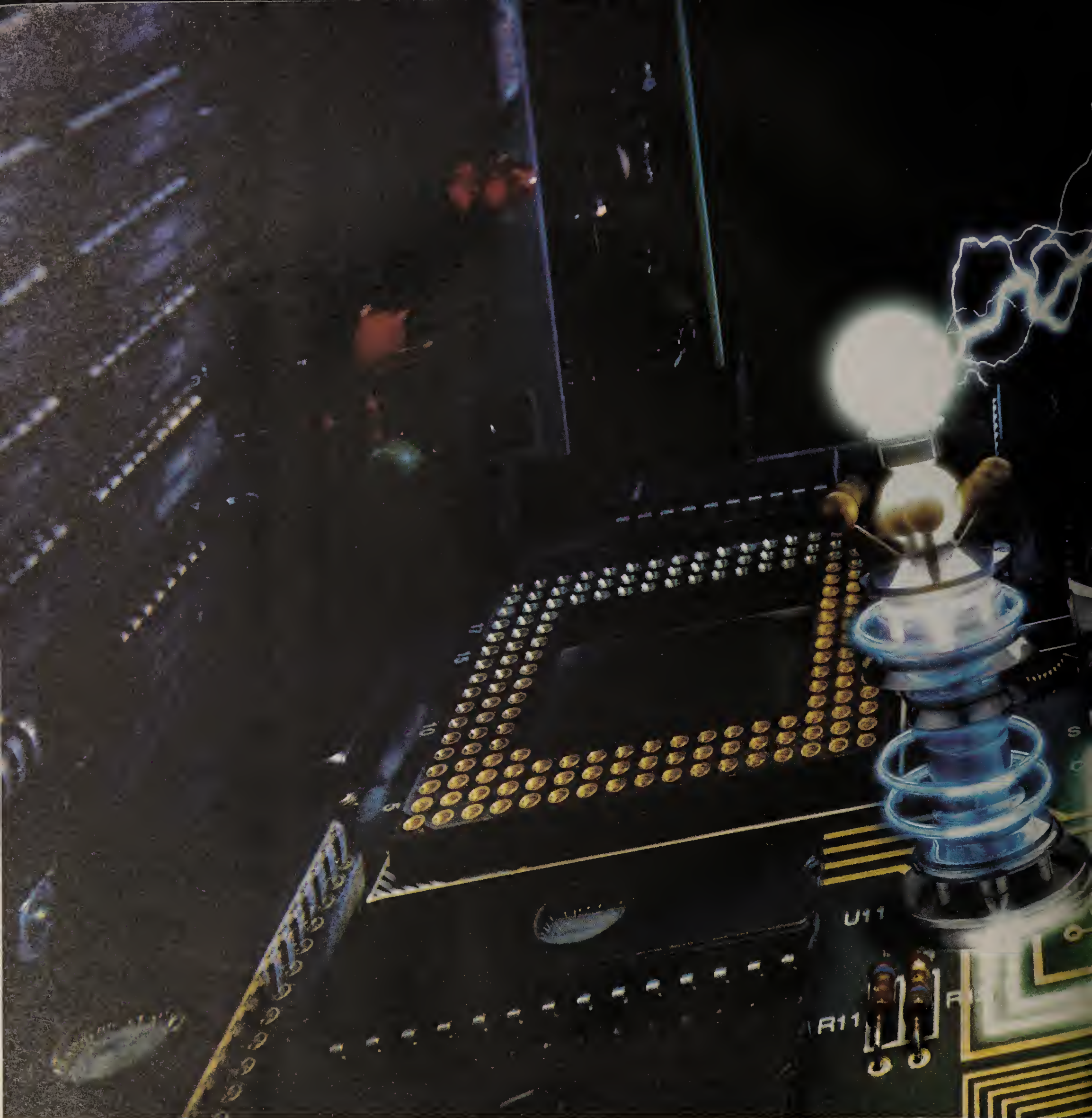
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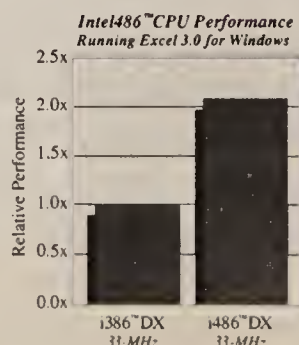


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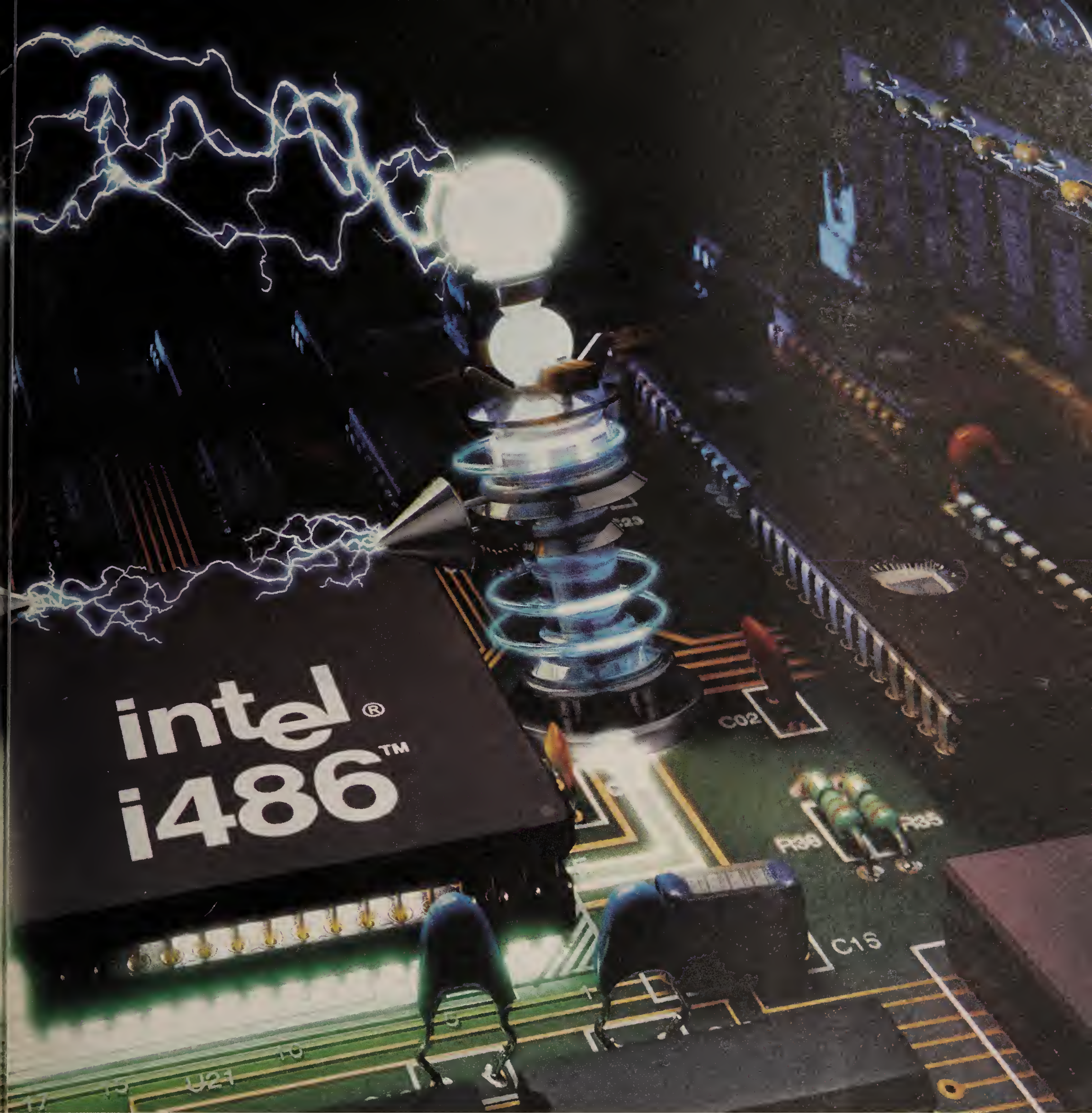
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TECH TALK

From Russia with CD-ROM

■ InterOptica Publishing Ltd., a multimedia software publisher, and the Institute for Informatics Problems of the Russian Academy of Sciences, have signed a pact to codevelop new multimedia software. The initial titles will concentrate on Russian themes and will be available in late summer. It is the first time a Russian organization has cooperated with either a Western or Asian company for the commercial codevelopment of multimedia products on compact disc/read-only memory.

Physics on disk

■ Knowledge Revolution, Inc., developer of computer simulation software, will create visual computer-based simulations for physics textbooks published by Prentice Hall, part of the Simon & Schuster, Inc. higher education group. Under a new agreement, Knowledge Revolution will create modified versions of Interactive Physics, a software program, for all of Prentice Hall's physics textbooks. College students will be able to visualize and experiment with physics by reading textbooks with complementing interactive computer simulations. The agreement reflects a growing trend toward integrating software into courseware and is a first in the physics community, the companies said.

Solitons go the distance

■ Scientists at AT&T Bell Laboratories have demonstrated error-free transmission of solitons — light pulses that maintain their shape over long distances — at 5G bits/sec. over 15,000 kilometers and at 10G bits over 11,000 kilometers. To accomplish the feat, the research team wove bits of information from one stream of data into the spaces of another to upgrade a 2.5G-bit signal to 5G bits. They then transmitted data on two wavelengths of light to reach 10G bits. It is still uncertain when the technology will be employed, the scientists said.

Retinal scanners eye-identify inmates

PS/2-based biometric devices keep track of prisoners at Chicago's Cook County Jail

BY ELLIS BOOKER
CW STAFF

Human eyes, sometimes called the "windows of the soul," are being used at the Cook County Jail on Chicago's South Side to identify inmates and keep them under lock and key.

The jail is believed to be the first in the country to use a retina scanning system to identify and process criminals through the court system.

Up to now, sophisticated eye scanners like the ones used here have been associated almost exclusively with high-tech security areas at military bases and government-funded laboratories.

Eye scanners belong to a group of access control devices that use biometrics, the physical characteristics that make each individual unique. Other approaches are based on a person's handprint or voice, for example.

Vital signs

"Look, if you can't take a biometric print, there's no real way to know who is who," said Tim Burns, coordinator of the Eye-Dent Program at the Cook County Sheriff's Department.

Matching bodies to paperwork was a real issue at this very busy jail, which processes some 400 people in any 24-hour period. It was not unheard of for inmates to exchange identities by memorizing each others' names, addresses and personal information.

But the \$500,000 biometric system, which became operational in October 1990, has made those tricks a thing of the past and has foiled 40 attempts to switch identities in the first half of 1991 alone.

The Criminal Eye-Dent system can



Russell O. Jones

be found two floors below street level at the massive Cook County Jail. There, just a yard or two from a 30- by 30-ft holding cell, sit 5 of the 24 Eye-Dent stations now being used by the department. Each of the slate gray particle-board cabinets houses an IBM Personal System/2 Model 25 computer and eye-scanning devices from EyeDentify, Inc. in Beaverton, Ore.

Eye scanners reflect a light beam from the retina and digitize the unique patterns of blood vessels there. This pattern is converted to an algorithm and is then stored in a database, where it can be quickly matched against existing eye records. The retinal "signature" is said to be more accurate than a fingerprint.

Besides the retina scan, operators at the stations enter a host of additional information, including the individual's physical description, name, address, clothing and even gang affiliation. Once an individual is "enrolled" in Eye-Dent, the system automatically searches for matches on both the information fields and the retinal image data. Within two minutes, the system generates a print-out — a sheet of paper that often lists aliases that the inmate may have used during previous visits to the jail.

Two Motorola, Inc. Delta Series 3000 reduced instruction set computing-based servers store and process the retina and alphanumeric databases. A retinal signature in the EyeDentify system takes up just 144 bytes.

Bacterium may increase computer memory

BY MICHAEL ALEXANDER
CW STAFF

At least some future computers will be filled with bugs if Robert Birge has anything to do with it. The professor and director of the Center for Molecular Electronics at Syracuse University in New York is working on developing computer memories and other devices derived from a bacterium called *Halobacterium halobium*, which lives in salt marshes.

Halobacterium behaves like an animal and a plant. When oxygen is in short supply, the bacteria makes energy by photosynthesis. It has another characteristic that makes it appealing to Birge: Shine a light on it and a protein called bacteriorhodopsin releases a small electrical charge, allowing it to

turn on and off like a light switch and to be used to store digitized data.

It is a fast transition, one measured on a picosecond time scale compared with the nanosecond time scale of today's semiconductors, Birge said. The speed cannot be harnessed yet, but it may be used someday to manufacture computers that are 1,000 times faster than any available today.

"It is not the protein that is slowing us down," Birge said. "In all of the devices we have made, the protein is way ahead of everything else — its speed far outstrips our ability to take advantage of it."

A tiny cube

Birge has been experimenting with creating computer memories from protein bacteriorhodopsin in a translucent container containing five cubic centime-

ters of the material. By zapping the container with two lasers, he is able to turn molecules on and off and record bits of information.

"We're working on storing a single bit of information in a minicube measuring 3 microns on a side," Birge explained. Smaller amounts of the material could be used; the "minicube" was chosen to make the device more reliable, he said.

"A 5-cubic-centimeter rectangle can store up to 18 gigabytes," Birge said. "That is something that could easily be put in a pocket. Birge is working on two types of memories: a read/write solid that can be updated as needed and a write-once read-many solid for permanent storage applications."

Creating the protein is neither costly nor difficult. The price of a rectangle would be about \$200, Birge said.

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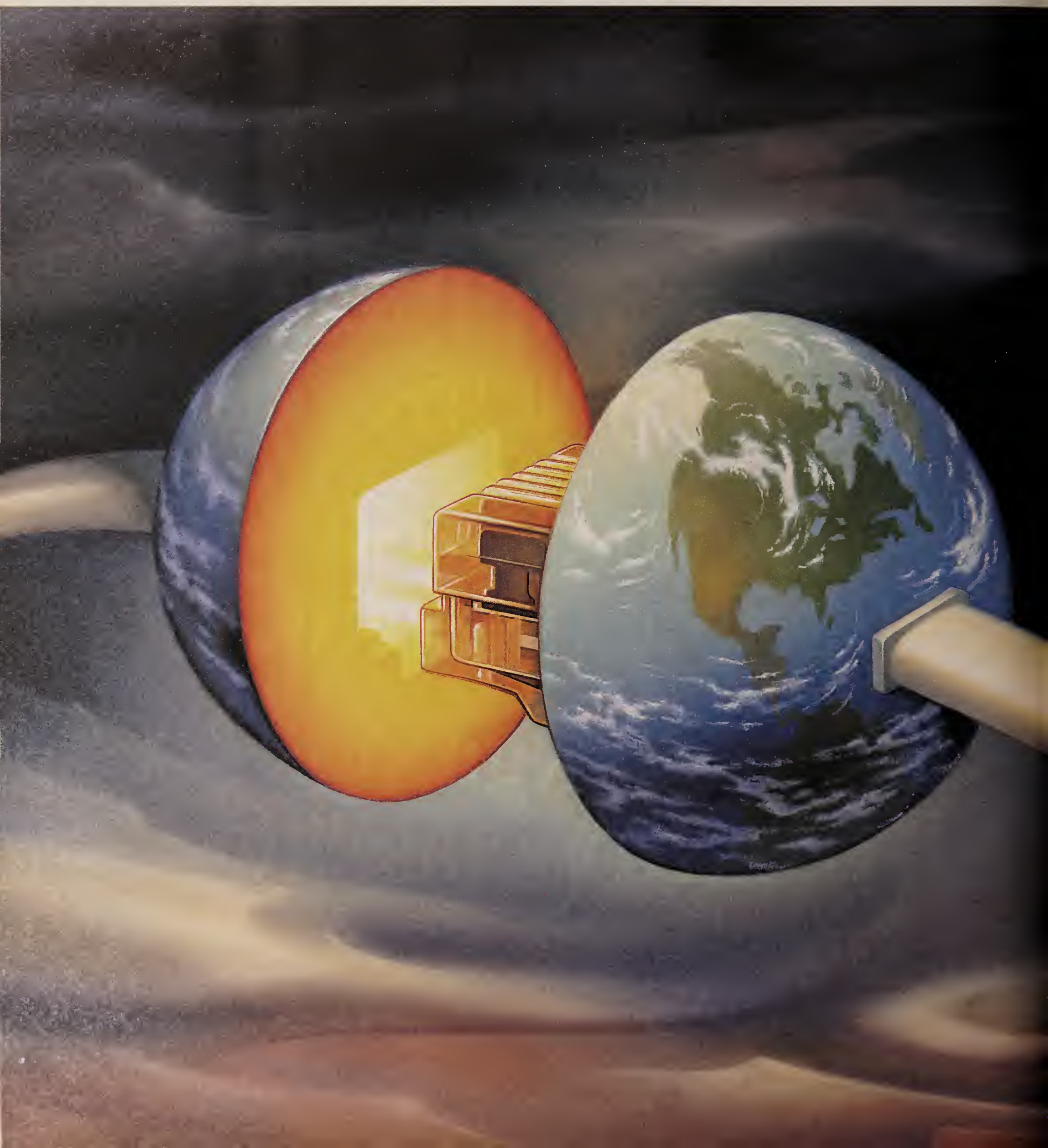
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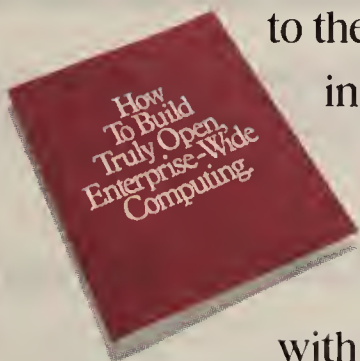
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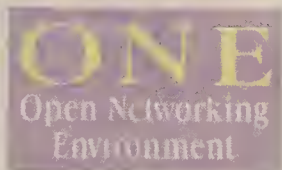
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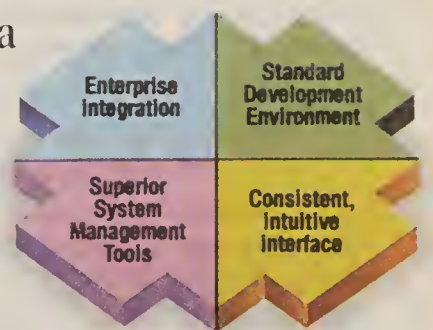


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EDITORIAL

Fault lines

As you read on our front page last week, the San Andreas Fault has claimed another victim, namely the data center of The Charles Schwab Corp. Schwab cited the San Francisco area's seismic sensitivity as the main reason for moving its computer operations to Phoenix.

Schwab joins several other companies that have moved their computer operations from the Bay area, and from San Francisco specifically, in recent years. It's that shaky ground underfoot. And that's a politically correct reason to leave.

But did you know that there are also fault lines — not at all unlike those beneath San Francisco — that run under New York City? So scary has the threat of those faults been that even former Big Apple Mayor Ed Koch's stunt of boarding up the Lincoln Tunnel couldn't prevent data centers from fleeing New York in droves.

Indeed, those faults are seismic — but only in the figurative sense. The faults are rooted deeply in a political structure that spans the U.S., a structure that is increasingly hostile to business at a time when the last thing a major city needs is the exit of another major taxpayer.

Let's take San Francisco, arguably one of the most beautiful cities in the world. Data centers have located there for decades, drawn by the city's ambience and opportunities. The San Andreas Fault predated the data centers by several millennia. So why leave now?

According to data from *Computerworld's* annual salary survey, a PC specialist (four years of college, maybe five years' professional work experience) earns an average of \$37,000 in the Bay area. That's about 75% of what a city-paid, tax-funded bus driver makes in San Francisco. That's the same city that, a few years ago, abruptly decided to halt the construction of high-rise buildings, setting off an unrivaled office rent spiral.

Then we have New York City, where the tax and fee structure on business is onerous almost to the point of absurdity. Two years ago, we at *Computerworld* tried basing a lone editorial correspondent in Manhattan. When we considered tax requirements that in total would have had us paying well into six figures *for a one-person office*, we stayed in New Jersey and brooked the occasional commute to New York.

Rapid advances in high-speed, broadband digital communications technology as well as developments in remote database access are making it increasingly attractive to relocate data centers virtually anywhere you can find good people to staff them.

While geological fault lines are one factor in locating motion-sensitive equipment, I believe they pale in comparison to the larger faults that underlie the data center flight from some urban cores. These faults extend from city hall to the state capital all the way to Washington, D.C.

Bill Laberis

Bill Laberis, Editor in Chief



LETTERS TO THE EDITOR

Victim protection

In reference to "What's wrong with the computer crime statute?" [Viewpoint, CW, Feb. 17], it would appear that Thomas A. Guidoboni reverts to typical defense tactics to develop recommendations amending the 1986 Computer Fraud and Abuse Act. To label clear and unambiguous language as "perilously vague" stretches credibility to its limit.

Given the conduct this act is intended to regulate, it would appear that the language is very clear. Anyone accessing a database either has the authority to proceed — however limited it may be — or does not. By broadening the universe, Guidoboni attempts to muddy the waters in an effort to raise some doubt based on nonexistent conditions.

Computer hackers who enter other people's information systems without authorization are the electronic equivalent of burglars who, whether they take anything or not, are guilty of breaking and entering. One danger hackers pose is that if they take something, it still remains where it was; therefore, the victim may never know something was taken.

Regarding Guidoboni's recommendation condoning intrusions into medical files, how does "invasion of privacy — a misdemeanor" sound? Whose constitutional rights shall we protect?

Can we discover a path that condones creative infiltration without further diluting laws that are already overprotective for the criminal, at the victim's expense?

Gene Wrona
Pennsylvania Power &
Light Co.
Allentown, Pa.

Corruption in records management

I agree that records management ["Ignore archive issues at your peril," CW, March 2] is an excellent application for which the computer is a well-suited tool. And indeed, it can help organizations meet Internal Revenue Service and regulatory requirements.

However, I was incensed at the implication that it should be used for unethical purposes. As a systems professional — and just as a human being — I am worried about the standards to which people hold themselves.

But to read in *Computerworld* that better records management should have been used by Oliver North, Dow Corning Corp. or Manville Corp. to cover up their activities is an outrage.

Maybe if your reporter or one of his loved ones had received silicone gel implants or been exposed to asbestos products, he would think differently about the suggested application of this technology.

I am surprised he did not mention that if Ford Motor Co. had better document control, it could have covered up the Pinto gas tank memo that discussed the value of customers' lives in relation to settlement costs.

You should give some thought to the fact that if the technology had been used in the way he suggests, many more people would have suffered and died.

Guy J. Natelli
North Kingstown, R.I.

User requirement: Adaptable software

Steve Hearn's In Depth column "Zero! Zippo! Zilch!" [CW, Feb. 24] is totally out of touch with real user requirements.

Hearn states that software adapts itself automatically to its environment. His examples are all labor-intensive and anything but automatic.

He also states that software is harder to modify than to replace. From a user perspective, this is totally unacceptable. If a program is critical to a business, it must be possible to adapt it to changes in tax codes, accounting practices, etc. This is like eliminating surgery by shooting the patient instead.

Finally, he states that software is impervious to change, ignoring business needs. Change is

a fact of life in the business world, and software that cannot accommodate it is useless.

A better point would have been to require the software to be impervious to unauthorized changes.

Seymour J. Metz
Annandale, Va.

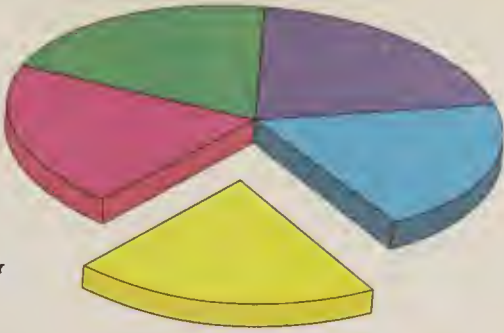
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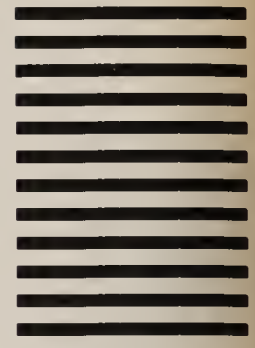
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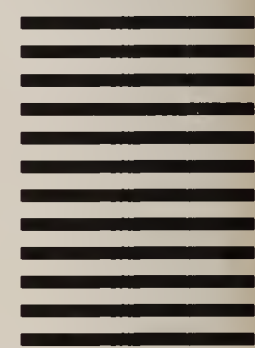
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Women: Scarce at the top

CAROLYN LEIGHTON



The fact that women are seldom promoted to senior management positions at U.S. technology firms or appointed to head technical functions in business and industry is something that should concern all of us. U.S. firms are losing out by failing to reward and promote talented women with technical backgrounds.

American women are the best educated in the world. They now comprise more than 50% of enrollees and degree recipients at all levels of higher education, except doctorate, as compared with 34% in Japan and 42% in Western Germany. If we were to decide to use women technologists more effectively, U.S. industry could enter the next century with an impressive edge over global competitors.

At present, women scientists still earn less than men in every field of science, regardless of their academic degrees or experience levels. Furthermore, many report feeling frustrated and dead-ended in lower-level positions and others complain of blatant sexual harassment.

An opinion survey completed by women attending a recent meeting of the International Network of

to advancement. In some cases, the obstacles included blatant on-the-job harassment. One woman wrote: "I have worked for three companies and have had unwanted and unwelcomed sexual advances by men in managerial positions at two out of the three companies. I am certain that this is very common to many women. This must stop."

Untapped resources

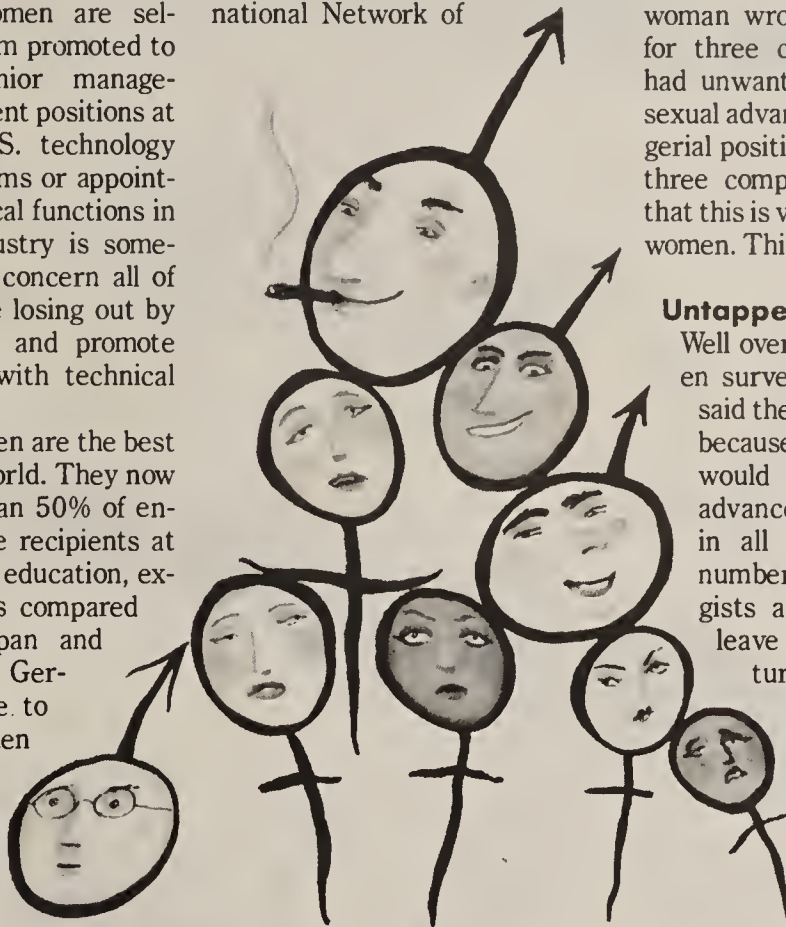
Well over a third of the women surveyed at that meeting said they had left a company because they felt that they would not be allowed to advance. Like many women in all fields, a significant number of women technologists are now choosing to leave the corporate structure and start up their own businesses.

While this trend may be good for the economy as a whole, it represents a significant loss to the established companies

Larry Ashton

they are leaving.

Profitability and success are often viewed as unrelated to the effort to increase the participation of females in top management. This perception is off-center and ultimately has a negative effect on the bottom line. Companies cannot, with impunity, ignore more than half of the talent



Women in Technology tells the story. Only 27% of the women responding — a mix that included women from the information sciences, software engineering and physics — said they felt they had equal access to jobs that positioned them for advancement. Eighty-four percent said they had encountered some barriers

Efficiency wasn't enough, so we learned how to dance

KENT C. NELSON



A few years ago, Rosabeth Moss Kanter wrote the book *When Giants Learn to Dance*. Her subject was large, complex organizations trying to become more responsive to customers and the changing realities of the marketplace.

United Parcel Service is a company with a quarter of a million employees and \$15 billion in revenue. We deliver more than 11 million packages a day in 180 countries and territories around the world. If that doesn't qualify as giant size, I don't know what does. Yet, we have made this organization dance.

During the 1980s, we decided to take on some tough competitors in the air express business. That forced us to add new elements to our operations; not the least of which were airplanes, their crews, mechanics and the systems required to support them. And, while we had offered

international service in Canada and Germany since the mid-1970s, we recognized that an expansion of international services would be critical to our success.

To understand the dimensions of the transformation, it may be useful to compare some key statistics. In 1983, our Information Services Group, which was primarily dedicated to accounting, billing and operations reports, totaled 90 people. Today, our information services function has 1,800 people — more than 3,000, if you count functional representatives in the field. We also use more than 35,000 PCs and 1,000 LANs to manage the information flow.

When any organization undertakes such a massive, capital-intensive program, budget and timetable are always issues.

Our approach to the budget may seem novel to many — we didn't have one. We let our training capabilities determine our pace. We hired, trained and managed the people and let the projects grow at that rate for the first few years. Our top manag-

ers were convinced that the strategic and cost paybacks were worthwhile. Not that the investment was modest: It was a multi-billion dollar commitment.

One of the best decisions we made, I believe, was the formation of a cross-functional information services steering com-

OUR APPROACH TO the budget may seem novel to many — we didn't have one.

mittee, made up of the No. 1 or No. 2 person in each of our functions and coordinated by the vice chairman of the company who, at the time, happened to be me.

This cross-function approach was a key element in the ultimate success of our efforts. We placed the responsibility for automation and technology improvements within the business functions, not with information services. Doing this meant we had to invest quite a bit of effort and resources in bringing relatively nontechnical personnel up to speed in a hurry. However, by putting respected functional managers on steering commit-

tees as management prospects. Whenever a significantly contributing professional exits a company, the cost is always greater than the dollars involved in hiring a replacement.

Also seldom calculated are the benefits of opening up management to women. Change engenders change, which can lead to greater innovation, creativity and increased profit.

To be fair, many firms are probably not aware of the extent to which their management selection is biased against women or other minorities. One good way of checking for such barriers in your company is to regularly collect data on salaries, promotions and special benefits, by sex, race and age. Another is to establish communication channels that will allow women to get around an "impossible" boss or other obstacles.

Women technologists must also bear greater responsibility for advancing their careers. If you are a woman working in this field, you have to be active about pointing out your contributions, taking the lead on projects and creating a visible role for yourself, not just in your company, but in the field as a whole. Strong access to contacts and critical information diffuse gender issues. If women in technology refuse to be ignored, the industry won't remain blind for long.

Leighton is founding executive director of the International Network of Women in Technology and president of Criterion Research in Sherman Oaks, Calif.

tees and strategic technology planning groups, we gained two benefits. We created instant credibility and we put the burden on each functional group to integrate and maintain new technologies in their daily operations. They could not simply come up with an idea and then walk away from it.

We made some important infrastructure decisions at the outset. Probably the most important was to develop a PC-based, multitier architecture in which our mainframe is the slave, not the master of the network.

We also made a few mistakes. Initially, for example, we probably put too much effort into the infrastructure, instead of holding some functions back and addressing more customer projects. Nevertheless, I am confident that we made good decisions for our organization and built a solid technology foundation for the future.

I'm happy to report that we not only run the tightest ship in the shipping business, but we dance pretty well, too.

Nelson is chairman and CEO of United Parcel Service, Inc. in Atlanta. This piece was adapted from a recent speech at a Conference Board conference in New York.

DESKTOP COMPUTING

PCs AND SOFTWARE • WORKSTATIONS

Lotus applications package on tap

BY ROSEMARY HAMILTON
CW STAFF

Lotus Development Corp. plans to make another pitch to corporate users by offering a set of its

applications as a desktop suite.

The company already offers volume deals to corporate accounts, but this latest move, called Smartsuite, will be sold as an individual package with sever-

al bundled Lotus applications. Customers contacted last week said they would welcome the move because it gives them another purchase option.

Smartsuite will soon be intro-

duced in the U.S. The package, which includes 1-2-3 for Windows, AmiPro, Freelance Graphics and a single node license for CC:Mail, is currently being tested in the UK, said Robert Weiler, the company's senior vice president of the North American Business Group. He said he could not provide a more specific time frame other than to say it will be announced soon.

Microsoft Corp. already offers such a package, called Microsoft Office for Windows. Initially introduced in October 1990 with three applications, the package was updated in May 1991 to include Excel, Word, Powerpoint and a Mail license. It carries a license fee of \$750. Weiler could not provide the U.S. license charge for Smartsuite. However, sources said, it will be in the Microsoft Office for Windows price range.

Make room for suites

Users said they like the idea of having suites available as a purchase option. They said the packaging not only costs less money than licensing individual applications, but it also provides an easier method to establish standards for end-user applications. However, users added, licensing suites means a commitment to a single vendor for several applications, which eliminates the chance to shop around for the so-called best-of-breed application.

John Roberts, vice president of corporate research and technology at Unum Corp., an insurance company based in Portland, Maine, said his staff is complet-

Trade-offs

There are both benefits and drawbacks to suite packages, according to customers

Upside

- + Ability to more easily standardize on a set of applications.
- + Lower prices.
- + Fewer vendors.

Downside

- Can't shop around for so-called best-of-breed for each application.
- Could create training and conversion problems if users are strongly committed to other vendors' individual applications.

CW Chart: Ianell Genovese

ing a desktop software evaluation and is about to choose providers. While he can not yet reveal his choices, he said the suite concept was a major factor.

"The ability of a vendor to provide a suite and the discounting was an important piece in the process of selecting tools," Roberts said. "Every vendor we had in here was pitching a packaged deal. It is very important to us in establishing our desktop strategy."

Canadian National Railway Co. in Montreal will consider suite purchases because of the consistency they can provide, said Ronan McGrath, vice president of information systems and accounting. "There is a certain myth in [Microsoft] Windows that all applications will work well together," he said.

"We have found a suite is a better idea" if vendors are providing integration and consistent interfaces and features across their product line, McGrath said.

Project software gets double kick

BY CHRISTOPHER LINDQUIST
CW STAFF

Symantec Corp. and Microsoft Corp. both announced the release of the market-leading project management software package. Whether that package is Symantec's Time Line 1.0 for Windows or Microsoft's Project Version 3.0 for Windows depends on whose press release you believe because both claimed market leadership.

However, it is not yet clear that much of the personal computer software market cares. "Of the major horizontal categories, project management has historically been the smallest," said Bill Higgs, director of software research at Computer Intelligence/Infocorp in La Jolla, Calif.

Higgs noted, however, that the release of products such as Time Line and Project may help improve project management's stand-

ing through easier-to-use graphical user interfaces and designs that do not assume years of experience with Gantt charts.

Time Line for Windows is Symantec's first Windows release

of the popular management package. Symantec claims ease-of-use features, such as a spreadsheet-like interface, make the package less intimidating for new users. Features include the following:

- The Co-Pilot analyzes the logical structure of a project and offers suggestions to users.

- A Connect Tool allows users to draw lines between task dependencies and assign resources.

- Info Boxes let users review timing task and resource data as well as task notes.

Project 3.0 is the latest version of the Microsoft Windows-based project manager. New features include a customizable Toolbar and macros that automate common sequences of commands.

Time Line for Windows costs \$699 for the stand-alone and server versions. Network node versions will cost \$599; Project for Windows, \$695.

Continued growth

The PC-based project management market is a steady growth area with the low-end segment representing more than half of the total

Total PC project management software unit shipments and revenues, 1990-1995

Year	Shipments	Revenue
1990	227,135	\$128.3M
1991	332,583	\$187.6M
1992	510,711	\$250.0M
1993	733,581	\$312.5M
1994	990,334	\$390.6M

Total low-end PC project management software unit shipments and revenues, 1990-1995

Year	Shipments	Revenue
1990	196,315	\$72.5M
1991	284,657	\$108.8M
1992	441,218	\$143.6M
1993	639,766	\$179.5M
1994	863,684	\$224.4M

Source: International Data Corp.

CW Chart: Michael Siggins

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I486-based notebooks hit market

BY MICHAEL FITZGERALD
CW STAFF

Users thirsty for power in a notebook got some new choices when Twinhead Corp. and Ergo Computing, Inc. released Intel Corp. I486-based notebooks earlier this month. Those moves were followed by last week's debut of a modular notebook computer from Librex Computer Systems, Inc.

However, users said in interviews last week that they are not ready to move to these desktop-class notebooks.

Michael Jones, vice president of information systems at LaSalle Partners Ltd. in Chicago, downplayed both types of systems, saying that the 486 is "not buying us a whole lot" on the desktop, let alone in the portable arena, and the company is not particularly interested in upgradeable systems.

"I F I CAN show a half-hour a week's saving in time for a person with one of these things, I have more than paid for the cost of a notebook."

J. BRISCOE STEPHENS
NASA

Leonard Steinbach, information center manager at the State University of New York's Health Science Center in Brooklyn, said that while the hospital purchases only 486-based desktops, he does not see a need for 486 technology in a notebook. "Our applications don't require that kind of power," he said.

Still, some users eagerly look forward to 486 power in a notebook.

"My job is to get rid of all the 386 machines, period," said J. Briscoe Stephens, data and IS manager at NASA's Earth Science and Applications Division in Huntsville, Ala. "We're interested in the 486 here."

Stephens said he likes the new color notebooks. He beta-tested AST Research, Inc.'s new Premium Exec 386SX/25C, and his group will buy a dozen of them. He downplayed color's high cost, saying "the cost of a notebook is five man-minutes over [its] life. If I can show a half-hour a week's saving in time for a person with one of these things, I have more than paid for the cost of a notebook."

Stephens said color notebooks do save time because they are easier to use than monochrome ones. He noted that they are essential for NASA, which

does atmospheric shading and needs products more portable than today's luggables.

Twinhead, a Taiwan-based clone maker with U.S. headquarters in Milpitas, Calif., brought out two 486-based notebooks at the Lap and Palmtop Expo, as did

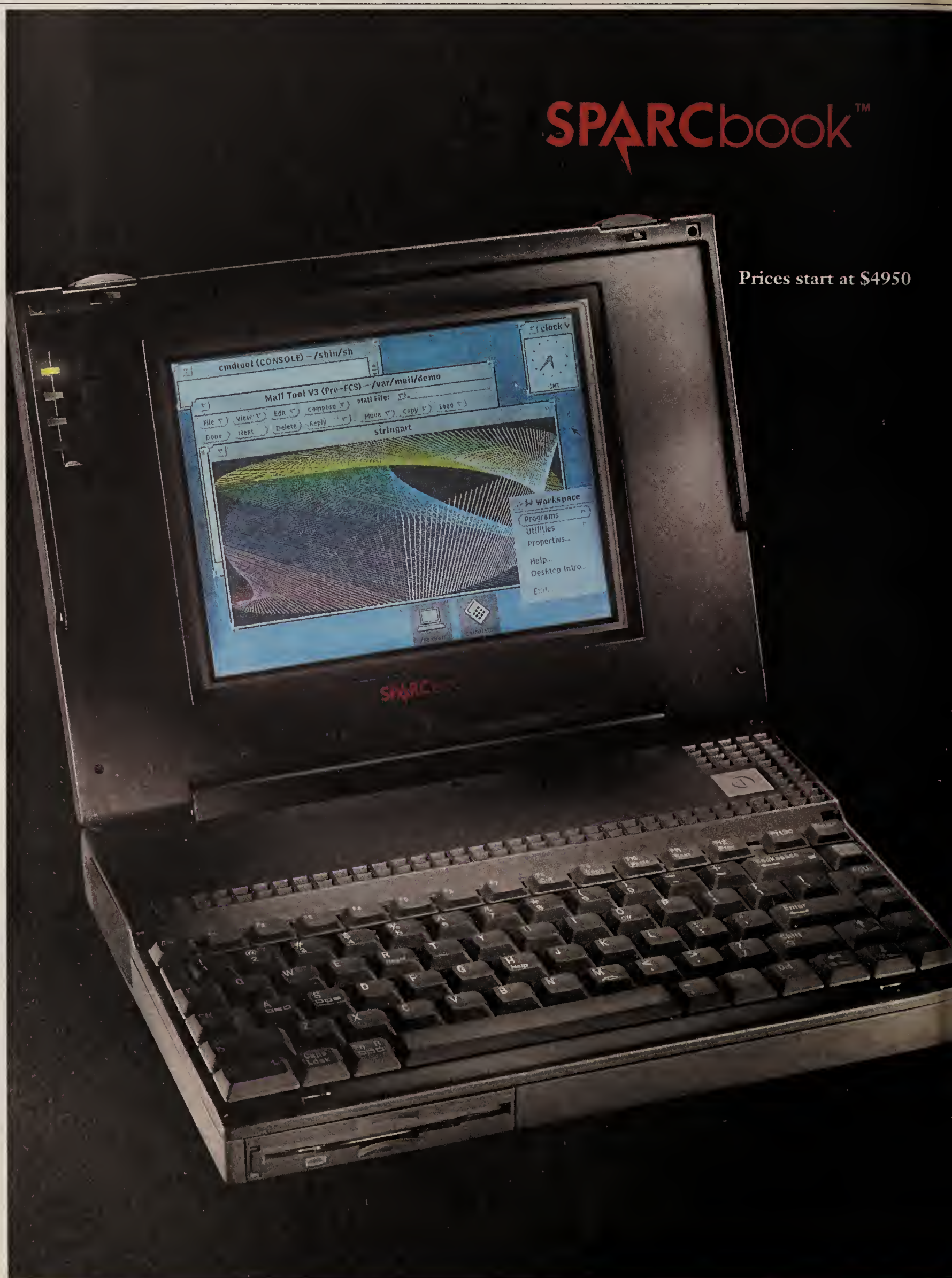
Peabody, Mass.-based Ergo. Twinhead's 5.8-pound Slimnote 486DX/33 will cost \$3,499, and its 486SX/20 will be priced at \$2,999. The company also introduced an Advanced Micro Devices, Inc. 386SXL-based notebook for \$2,399, which

Twinhead said provides six to nine hours of battery life.

Librex Computer Systems, a San Jose, Calif.-based subsidiary of Nippon Steel Corp., is making another run at the portable market. The company last week introduced its T386SX, an upgra-

dable SX notebook with Personal Computer Memory Card International Association slots for memory and peripherals.

The notebook will come with removable hard drives, 40M bytes of standard memory, 80M or 120M bytes of optional memory and 4M bytes of random-access memory. Base configuration is priced at \$2,799.



Theos Software updates multiuser DOS

BY JAMES DALY
CW STAFF

WALNUT CREEK, Calif. — Theos Software Corp. has primed the pumps on its Theo+DOS multiuser DOS operating system, fortifying the

Version 2.0 update with added DOS 5.0 support and increased memory.

The \$299 Theo+DOS 2.0 adds support for the Devicehigh and Loadhigh commands of DOS 5.0, enabling users to load DOS, terminate/stay resident pro-

grams and device drivers in upper memory blocks instead of in conventional random-access memory. As much as 952K bytes of memory is available to individual Theo+DOS users, a Theos spokesman said.

Additionally, Version 2.0

adds customization features that permit members of a multiuser workgroup to control a number of variables — such as installing a mouse or loading drivers — within their own DOS environments. Multiuser DOS systems have gained fans in recent years

because they are seen as a way to gain the benefits of workgroup computing without the hassle of installing and maintaining a local-area network.

The multiuser systems are really DOS systems — they run DOS software, use DOS commands and follow DOS convention — but with an added technological twist: They allow users to link dumb terminals and personal computers to a central processor, thus getting LAN benefits at a fraction of the cost and complication of installing a LAN.

They were also designed to be cheaper to run than DOS systems because users can display applications on low-cost dumb terminals instead of more expensive PCs. Multiuser DOS systems also do not require a network administrator because all file access is done directly to the bus and not across additional layers of network hardware and software.

Multiuser systems have also won points for their security benefits — users working on dumb terminals are physically incapable of removing data from the system because the data is stored centrally in a host computer.

A powerful idea

Although the idea of multiuser DOS is not new, it has gained momentum with the advent of powerful chips such as the Intel Corp. 80386 and I486. Multiuser DOS systems are employed by 300,000 domestic users, according to the Multiuser DOS Federation in Santa Clara, Calif.

Theo+DOS also features an automated installation routine that permits users to upgrade to Version 2.0 by simply selecting the upgrade option from the menu. Version 2.0 also facilitates the passing of information among applications through a set of interprocess communications tools.

Multiuser DOS are not, however, for everyone, according to the federation. LANs make sense when individuals need to run processor-intensive applications such as computer-aided software engineering or financial modeling. LANs may also be more appropriate when large numbers of users — for example, 50 to 100 — are required to connect to a centralized set of files or peripherals.

Meet the Notebook that Breaks the Mold

At just 6.8 pounds, SPARCbook 1 is light enough to carry comfortably and small enough to fit in your briefcase. Yet it incorporates the same power of the world's most popular desktop workstations from Sun Microsystems, including: a SPARC RISC processor sustaining 18 MIPS, 8 to 32 MB of fast DRAM and up to 240 MB of disk space.



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In the office, SPARCbook is a powerful desktop workstation. It connects to your corporate Ethernet network and supports VGA or Super VGA displays for big-screen color graphics and VGA projection units for presentations.

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PROCESSOR	25 MHz SPARC IU and FPU
DRAM	8, 16 or 32 MB
INTERNAL STORAGE	85 MB to 240 MB hard drive options 1.44 MB 3.5" floppy drive (85 MB and 120 MB units)
DISPLAY	Gray scale or color 640 x 480 resolution LCD External VGA or Super VGA support
COMMUNICATION	Ethernet and modem with SendFax capability
BATTERY	Removeable, rechargeable NiCad battery
KEYBOARD	82 full-size keys including integrated MouseKey and 12 function keys
DIMENSIONS	11.8" x 8.5" x 1.9"
WEIGHT	6.8 pounds (with battery)
BUNDLED SOFTWARE	Solaris 1.0.1 SPARCbook Version (SunOS 4.1.2) operating system with X11/NeWS window server and OpenWindows Version 3 with DeskSet tools, modem with SendFax, Ethernet, power management software and MS-DOS emulation with hardware VGA graphics

A sophisticated power management system maximizes the life of your battery, ensures data integrity and saves time. For less demanding applications, you can conserve battery power by switching the processor's speed from 25 MHz to 12.5 MHz. The automatic SAVE and RESUME function safeguards your system from unexpected power down and eliminates the need to boot the system when you switch it on.

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WordPerfect challenges Microsoft

WordPerfect replaces Executive with multipurpose package based on LetterPerfect

BY CAROL HILDEBRAND
CW STAFF

Switching the usual scenario, WordPerfect Corp. took the offensive against Microsoft Corp. with the introduction of WordPerfect Works.

Paired against Microsoft's multifunction software of the same name, which claims an estimated 21% of the corporate market, according to Computer Intelligence in La Jolla, Calif., WordPerfect Works will take the place of Executive, its

earlier effort in the same field.

"Executive was getting older and was not quite up to snuff," product marketing manager Steve Call said. "So we created a new product from the ground up."

Total package

Works 1.0 is a DOS-based product that combines LetterPerfect, the company's truncated version of its namesake word processor, with a graphics editor, database, spreadsheet capabilities and a communications application.

Company officials claimed it is the most fully featured application of its type. However, although they did not rule out the thought completely, there are no immediate plans to bundle WordPerfect Works with personal computers, a tactic that has served their Redmond, Wash.-based rival well.

Mary Conti Loffredo, an analyst at Framingham, Mass.-based research firm International Data Corp., said, "On the DOS end especially, it stands a really good chance. I don't know how well it will do

outside the WordPerfect realm, but it's a nice additive program for WordPerfect users."

Kevin Ebi, a free-lance consultant and beta-test user in Puallup, Wash., said that what impressed him most was the round-trip file compatibility with WordPerfect 5.1 as well as such products as DrawPerfect and PlanPerfect.

Ebi cited an instance in which he called a 5.1 file containing 65 different fonts into LetterPerfect, edited it and then sent it back.

Ebi's one small complaint concerned charts. "You can only create charts from within the spreadsheet," he said.

Works costs \$159, with trade-ups from Executive or Letterperfect available for \$99.

**"Scuba tanks are
all alike. Buy the cheapest
one you can find."**

Users to drive licensing trend

BY CAROL HILDEBRAND
CW STAFF

CAMBRIDGE, Mass. — As companies grapple with the increasingly complex issues spawned by software licensing, one study predicted that many will turn to the one-shot relief offered by corporate site licensing.

A study released last week by Forrester Research, Inc. forecasted that an increasing number of vendors will begin to offer corporate licenses, and the practice will have a profound effect on the software industry as it becomes more widespread.

Based on a survey of 50 Fortune 1,000 companies, Forrester found that more than half of the companies are dissatisfied with their present licensing situation. Policies that differ vastly among different applications in the corporate portfolio as well as the emergence of the local-area network have made license management a headache for many company administrators.

Maintaining sanity

"Essentially, the primary catalyst is management efficiency. With the plethora of differing license types and a simultaneous lack of management tools, users are forced towards seeking out a blanket relationship to make life sane," said Neal Hill, a senior analyst at Forrester.

As the issue of software licensing begins to hit vendors in their bottom line — about half of the respondents rated licensing issues as very important to their purchasing decisions — Forrester predicted that vendor acceptance of corporate licensing, or one blanket software license that covers an entire company, will accelerate.

The report predicted that once one of the top three software houses takes to corporate licensing as a competitive advantage, the rest of the industry will be forced to respond.

"I expect to see Borland in particular, with its history of using price as a differentiator, really beginning to break the dam here," Hill said.

As corporate licensing gains acceptance, Forrester predicted that pricing will take a dive while vendors' account control strengthens and support issues become more important.

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IN BRIEF

Japanese WP tools

■ **Microsoft Corp.** has announced the availability of Japanese versions of its Excel spreadsheet and Word for Windows word processing packages. The packages include support for both the Kanji and Kana character sets, horizontal and vertical text wrapping, customized calendars, the metric system, Japanese currency support and bilingual word processing, file sharing and saving.

■ **Norwood, Mass.-based Phoenix Technologies Ltd.** has announced that it will supply a line of BIOS upgrades for personal computers directly to end users. The upgrades will provide support for large-capacity hard disk drives, 3½-in. floppy drives, local-area network compatibility and optimal use of new applications. The upgrades will be available through Norman, Okla.-based Micro Firmware, Inc.

■ **Carlsbad, Calif.-based Stac Electronics** has brought out a data compression chip, the 9706, designed to connect directly to a microprocessor's local bus. With the 9706, data transfer rates of up to 30M byte/sec. can be achieved, the company said.

• **Integrated Information Technology, Inc. (IIT)** in Santa Clara, Calif., released a Data Compression Processor. IIT said it is the first single-chip implementation of a compression algorithm that will boost throughput by up to 10 times. The chip requires no external memory. IIT will target it toward applications that take up large quantities of memory, including graphics and computer-aided design.

■ **The Multimedia PC Marketing Council** loosened restrictions on licensing its Multimedia PC trademark. The revised policy will offer firms licenses without their having to join the 12-member council.

COMMENTARY

Jeff McGroary

Windows and OS/2



Windows or OS/2? This is a question posed by many IS managers as they formulate their client/server computing strategy. However, the answer in a surprising number of cases is Windows and OS/2.

Windows' strengths often make it the platform of choice at the client level, while the capabilities of OS/2 make it an excellent choice as the server platform.

Windows often beats out OS/2 as the best client-level computing platform based on an abundance of Windows appli-

cation software. Windows now boasts an impressive array of business application software products.

Though "easy" is not a word often associated with either Windows or OS/2 development, the Windows API is relatively easier to use than its OS/2 counterpart.

This is certainly another consideration for companies planning to do in-house development. Aesthetics also play a role in the decision — Windows 3.0 gets high marks for its 3-D effect visual interface.

OS/2, with its Extended Edition (EE) SQL Database Manager and Communications Manager components, is a strong contender as a server platform. This is especially true where the server also provides a gateway to a mainframe SQL database system. OS/2 EE's tightly coupled database and communications facilities provide the glue that links the mainframe level to the individual client workstation level in a hierarchical systems environment.

The multithreading and pre-

emptive multitasking capabilities of OS/2 are technical features that are important in the development of sophisticated and reliable client/server, network management and communications software — the prima-

WINDOWS IS THE client platform of choice, while OS/2 is the more popular server platform.

ry functions of a server.

The OS/2 API also contains many of the functions necessary for the development of client/server applications — particularly the functions for creating and managing named pipes. Named pipes is one of the primary means of communications between a server and its client.

A strategy involving both Windows and OS/2 is not without its special considerations. Both database compatibility and de-

sign of the communications interface between the server and client are of critical importance. Whereas OS/2 can manage communications at the server using independent, pre-emptive threads, Windows has no such inherent capability.

The same effect can be created in Windows through the use of message loop processing and timers, but careful design is necessary to avoid performance degradation or, worse yet, deadlock on the client workstation.

The strengths of the Windows and OS/2 platforms are, to a great extent, a reflection of the strengths and orientation of their developer. Windows reflects Microsoft's focus on the PC computing arena, while OS/2 reflects IBM's enterprise computing orientation.

Instead of an either/or choice, IS managers might well craft a client/server strategy that takes advantage of what each platform has to offer.

McGroary is president of The Aristos Co., a West Hartford, Conn.-based Windows and OS/2 consulting firm.

NEW PRODUCTS

Software applications packages

Innovative Data Design, Inc. has started shipping MacDraft for Windows, a personal computer version of its Apple Computer, Inc. Macintosh precision drawing and design software.

MacDraft for Windows offers a drawing tool set including arcs, splines and freehand shapes; users can create multilayered drawings in English or metric units.

Pricing is set at \$495.
Innovative Data Design
2280A Bates Ave.
Concord, Calif. 94250
(415) 680-6818

NovaStor Corp. has released NovaWare, a set of utilities for personal computers running OS/2.

The suite of programs includes NovaBack, which provides backup and restore capability; TPU File Transfer, which transfers data sets between PCs and mainframes; and Data Conversion Utility, which converts data on a field-by-field basis while transferring it from an input file to an output file.

NovaBack supports 4mm digital audiotape and 8mm drives as well as ¼-in. cartridges of up to 1.35G bytes.

The NovaWare collection costs \$1,595. Purchased separately, NovaBack costs \$295.

NovaStor
Suite 109
30961 Agoura Road
Westlake Village, Calif.
91361
(818) 707-9900

Peripherals

Ventek Corp. has announced Chroma Gold, a Super VGA adapter that includes NTSC video output.

Chroma Gold provides 1,024-by 768-pixel resolution and 32,768 colors. It can display computer output on a standard television and includes software support for common presentation and animation applications.

The price is \$369.

Ventek
Suite 102
31336 Via Colinas
Westlake Village, Calif.
91362
(818) 991-3868

Software utilities

PenStuff, Inc. has created the PenStuff RPN12C+ Financial Calculator, a software product that runs under Go Corp.'s Pen-Point operating system.

The product features simple and compound interest calculations and other financial functions, along with context-sensitive help.

The price is \$59.

PenStuff
1100 University Ave.
Rochester, N.Y. 14607
(716) 461-3182

Systems

Microway, Inc. has begun shipping the 25-MHz FastCache-SX/Plus, an upgrade board for XT/AT bus personal computers.

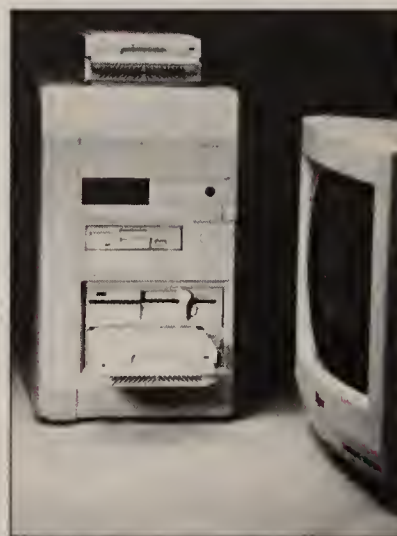
The board incorporates a 386SX processor and high-speed memory. It can be config-

ured to provide up to 16M bytes of extended memory.

Pricing starts at \$595. Memory and coprocessor options are priced according to current rates.

Microway
Building #20, Cordage Park
Plymouth, Mass. 02360
(508) 746-7341

Data storage



Mercury hard drive access times range from 9 to 12 msec.

Mega Drive Systems, Inc. has introduced the Mercury series of half-height removable hard drives.

Internal and external models are available with capacities ranging from 52M bytes to 1G byte. Average access times are from 9 to 12 msec.

Pricing for a complete subsystem ranges from \$1,129 to \$6,559.

Mega Drive Systems
489 S. Robertson Blvd.
Beverly Hills, Calif. 90211
(310) 247-0006

SyDOS has announced additions to its removable Winchester disk

drive product line.

The company now offers a Micro Channel Architecture adapter kit, an 8-bit standard adapter kit and two 88M-byte drive configurations with the 8-bit adapter.

SyDOS also announced reduced pricing across the product line. The SyDOS 44/2 external subsystem with dual 44M-byte drives is now priced at \$1,759; the SyDOS 44I internal 44M-byte model costs \$799; and the SyDOS 88I internal 88M-byte drive costs \$1,539.

Additional 88M-byte cartridges cost \$278, and 44M-byte cartridges cost \$178.

SyDOS
Suite 110
6501 Park of Commerce Blvd.
Boca Raton, Fla. 33487
(407) 998-5400

Database management systems

WordTech Systems, Inc. has developed Arago, a line of relational database management system products.

The Arago line is compatible with Borland International, Inc.'s dBase. It includes Arago dBase (\$699), an RDBMS, and Arago Quicksilver (\$799), a dBase IV-compatible EXE compiler. The Arago Professional kit (\$1,199) combines both the RDBMS and the compiler.

Arago runs under DOS. Unix versions and versions for local-area networks are also available, the company said.

WordTech Systems
21 Altarinda Road
Orinda, Calif. 94563
(510) 254-0900



White Paper

WORKGROUP TECHNOLOGY:
TYING TECHNOLOGY TO
BUSINESS OBJECTIVES

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Case Study: Dell Computer Corp.

Post Implementation Analysis

Introduction

At a time when so much emphasis is being put on the importance of understanding and automating specific business functions, workgroup computing is increasingly providing solutions for users. Its ability to create quantifiable hard-dollar savings while bringing people together in productive work environments puts it in an ideal position to prosper in the '90s and beyond.

Properly applied, workgroup systems have the potential to spark productivity increases that far outstrip any produced by the heralded personal productivity applications of the '80s. And the value of these systems is only enhanced by their ability to augment, not supercede, existing technology investments.

Whether it be a "group" of two people or 200, workgroup computing can be deployed successfully. Its benefits include ease of use, scalability, security, heterogeneous support and the availability of more meaningful data. One of its greatest attributes is its openness to customization. This openness allows users to gain invaluable knowledge about their business processes while customizing off-the-shelf products or developing their own workgroup computing software.

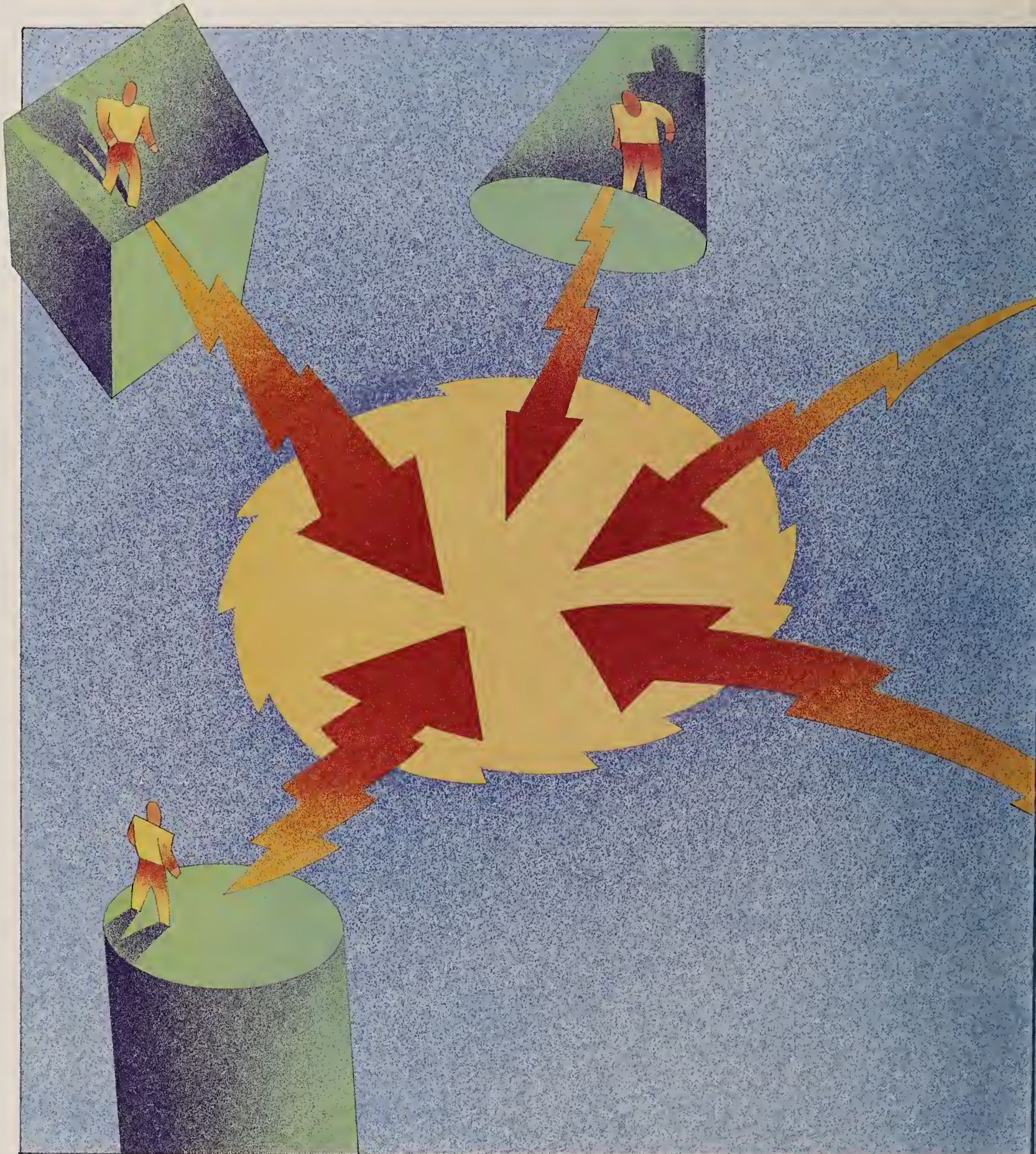
Despite the many benefits, success with workgroup systems does not always come without a price. Unrealistic expectations can be created in the wake of an initial workgroup computing implementation. It is important to temper those expectations by making it clear from the beginning that a checklist of procedures must be followed for each new implementation.

Especially in its early stages, workgroup computing is a fragile process. If business objectives are not properly defined, if the workgroup team does not reflect a balance of technological strengths, or if the scope of a project is misjudged, the result can be failure.

Such failures will be few and far between for users who take the time to implement workgroup systems properly.

This White Paper was written independently of the *Computerworld* editorial department by Ann Palermo, Director of Workgroup and Messaging Research, at International Data Corporation.

For more information on the content of this White Paper, or for information on International Data Corporation, please call 508-872-8200. For more information on the White Paper Program, please call 508-879-0700.





WORKGROUP TECHNOLOGY: TYING TECHNOLOGY TO BUSINESS OBJECTIVES

IT IS OFTEN STATED THAT OPEN SYSTEMS AND STANDARD PLATFORMS WILL SHAPE COMPUTING IN THE '90s. THIS MAY BE SO, BUT THE SINGLE COMPUTING DISCIPLINE THAT WILL BRING THE BIGGEST REWARDS TO USERS IN THE '90s WILL BE WORKGROUP COMPUTING. ■ THIS IS BECAUSE WORKGROUP COMPUTING IS NOT DEFINED BY

AN OPERATING SYSTEM, A HARDWARE PLATFORM OR AN INTERNATIONAL STANDARD. WORKGROUP COMPUTING SHOWCASES WHAT THE BEST COMPANIES DO BEST — RUN THEIR BUSINESSES AND KEEP THEIR CUSTOMERS SATISFIED. ■ WORKGROUP COMPUTING IS NOT A FRINGE CONCEPT, BUT A PIVOTAL COMPUTING APPROACH

THAT HAS THE POTENTIAL, WHEN WELL APPLIED, TO PROVIDE A DISTINCT COMPETITIVE EDGE. IN THE '90s AND BEYOND, WORKGROUP COMPUTING WILL HAVE AN IMPACT ON CORPORATIONS WELL BEYOND THE PC SOFTWARE REVOLUTION OF THE '80s. THE TELLING DIFFERENCE WILL BE IN ITS TIES TO THE DETAILS OF DOING BUSINESS,

its directly quantifiable business benefits, and the impact it has on the way people work together to realize these benefits.

What exactly is workgroup computing? Workgroup computing does not have strict boundaries or a crisp definition. It is, rather, a concept that fills the chasm between personal productivity applications and enterprise-wide solutions. Successful workgroup computing addresses needs previously ignored by computer technology.

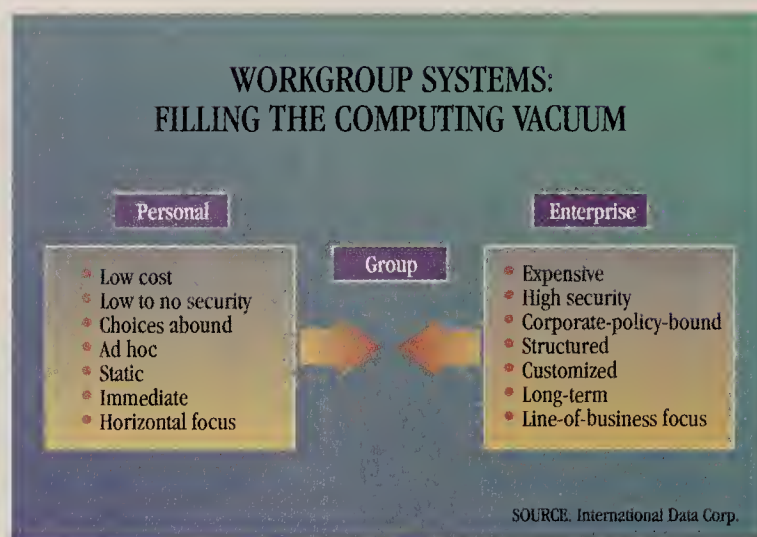
More and more, companies are gaining clear business benefits by mapping technology directly to detailed business processes. Packaged solutions are beneficial to a point, and that point will put a company on a par with any other business that has purchased that same solution. Therefore, the greatest business benefits are reaped by tailoring tasks and processes to the unique way companies conduct their business.

AUGMENTING CURRENT TECHNOLOGY

Enterprise computing solutions were the drivers behind the wide-scale adoption of computer systems through the '60s and '70s. These systems offered greater organization, more immediate access, more versatile information retrieval options and faster processing.

The '80s brought with them personal productivity applications that dramatically changed the way individuals approached their work. Painstaking calculations, labored crafting of prose and hand-drawn graphics quickly were adapted to more automated and productive results with spreadsheets and word processors. Users worked at their own pace, with their own choice of the most appropriate tool.

Workgroup computing is not designed to displace current technology investments, but to augment them and allow users to automate previously manual functions. For example, workgroup computing is designed to work on decentralized LANs, tying together loosely organized groups of people, and allowing them to work together more effectively. It is used for sharing information, helping people to track their work and to collaborate on team management projects.



There is a spectrum of group computing products on the market. These products vary from personal productivity, out-of-the-box "groupware" (e.g., ON Technologies' products), to more enterprise-wide business-tailored workgroup systems environments, like Lotus Notes.

Quickly and with little training, workgroup products get groups of people up and running on simple applications that require cooperative work. For example, on the low end, collaborative authoring among members of an editorial staff lends itself to a low-cost, high-productivity group tool.

At the high-end, with what IDC calls workgroup computing systems, product requirements focus more on business issues. For example, tracking the flow of work through a customer service organization.

One of the most appealing elements of workgroup computing is that the cost and resources needed to deploy a workgroup system are quite small. However, it would be a great mistake for a user to simply buy an off-the-shelf package and believe it will make a significant business contribution. This is because one of workgroup computing's biggest benefits is the knowledge gained from analyzing business processes, the first step in implementing a workgroup system.

KEY FEATURES

How then, are we to recognize a workgroup system and compare one to another? There are some key features that any good workgroup system should include:

Ease of Use

A simple axiom differentiates work-

group computing from personal productivity applications: to be successful, everyone in the group must use it. Thus, the process must be made more intuitive to the user. This includes shielding the user from such things as host interfaces and computer languages. In some cases, it may mean automatically sublaunching transparent applications.

Scalability

People in workgroups usually work in the same building or group of buildings. Increasingly, however, workgroups are spread

across remote locations, and even different companies. The more sophisticated workgroup systems generally have an underlying database. A key product selection criterion is the degree to which the underlying database can be effectively distributed and updated in a timely fashion.

Security

Security is generally defined by the user. Features may include view-only, editing rights, create rights, approval/denial rights, access to all or only a portion of the document, and management reporting information access. Security rights may extend to the right to know whether or not a file even exists in the system.

Heterogeneous Support

The variety of individual user requirements precludes the use of only one desktop device or operating environment. For example, a PC user may simply require access to the workgroup application and some other PC software. In contrast, a heavy user that requires terminal windows, application windows, database windows and workgroup application windows will likely need a multi-threaded operating environment. This will become more and more a requirement. Further, because of the realities of current network installations, particularly across multiple sites, support of several LAN operating systems is required.

Open Access to Other Data and Information

One of the greatest advantages of workgroup systems is their ability to ac-

Workgroup Technology: Tying Technology to Business Objectives

cess information outside the normal user domain. Access to internal and external databases, with full import and export facilities, is part and parcel of many workgroup solutions.

Customization

Effective workgroup systems must be customizable by at least two groups: end users and application programmers. This ensures that the people who know the business best can effect full-blown applications. Application developers can transcend individual application development efforts. This means developers can build a baseline application, which can then be leveraged by multiple user-driven application efforts. For end users, a graphical environment is a requirement.

WORKING WITH IS TO IMPLEMENT WORKGROUP COMPUTING

Another major benefit of workgroup computing is that, in many companies, it may be the first application jointly initiated by IS and line-of-business managers.

Traditionally, the adoption of new technology involved a top-down approach. Central IS was the gatekeeper of new technology, and commonly the first user. It was only as technology became less expensive that it filtered down to lower levels of the organization.

Most companies have recognized that they can no longer afford this approach. They want to apply discrete technology to specific business problems as quickly as possible. This is particularly true of workgroup applications.

For workgroup applications, the department, group or line-of-business manager is commonly the cornerstone of the application content. He or she knows the details of the specific business process and is in a position to analyze that process, recommend changes and evaluate the results.

This cannot be done in a vacuum, however, as many workgroup applications will test the limits of the technology infrastructure, which is maintained by IS. IS must be intimately involved with the deployment of workgroup applications to ensure that the corporate technology infrastructure can balance their requirements.

Frequently, after the first successful workgroup application, the number of follow-on applications grows quickly,

limited only by user imaginations and the IS-supported technology. Empowering the user does not mean less responsibility for IS, it means giving the user the tools and resources to do more. Particularly in the case of networked applications, this will entail extensive support from IS.

It may look as though this is just more work for IS, while the laurels go to the business manager. However, a broader view must be taken. Involvement in the deployment of workgroup applications should be considered an opportunity for IS to become a more critical team member, and to better understand specific business practices.

IMPLEMENTATION CHECKLIST

Workgroup computing will impact businesses in a way office automation never could — quantifiably. There will be no gains to quantify, however, without a proper amount of planning and preparation. IDC believes workgroup computing should be implemented through a series of sequential steps.

Define Business Objectives

The first cut at defining business objectives should be kept general in nature. Try not to wade into specific details. For example, one objective could be improvement in the productivity of sales support personnel. Another could be improved customer service as a result of making internal information available with faster document development. By staying at a general level, users can list the benefits or problems without any particular product in mind.

Once the initial goals are set, the next step is deciding which objectives are tactical and which are strategic. This is important because strategic issues are more likely to require significant customization of workgroup packages, while tactical objectives may be realized with little to no customization.

Having taken these initial steps, users will have already gained some insight into what kind of workgroup product is best for them and the resources they will have to allocate.

THE SPECTRUM OF GROUP COMPUTING

Groupware application	Workgroup system
• Out of the box	• Customized, APIs available
• Low investment, replaceable	• Higher investment in consulting, business process analysis
• Low security	• Moderate to high security
• Team is proximal, small	• Team may be dispersed, even multicompany, multinational "Virtual Team"
• Single domain, limited growth	• Multidomain, scalable
• Easy to use	• Easy to use and tailor
• Confined application	• Open access to other data, external information
• PC software price levels	• Customization and support buying costs toward enterprise solutions level
• Possible short-term solution	• Tailored to business activities, longer term
• Horizontal, a shoe-horned vertical solution	• Horizontal, tailored to business application or tailored line of business
• Possible platform constraints	• Heterogeneous environment support

Why companies workgroup products

The innovative, collaborative computing environment for your LAN-based applications.

It's simple. Lotus Notes® is revolutionizing the way people work together by making it easy for people to share information.



In fact, Lotus Notes is actually helping both small and large companies gain a competitive advantage by providing an open, workgroup computing environment that enables organizations to more effectively share information in LAN-based applications. Such as databases, spreadsheets, graphics and word processing.

Which means Notes is more than a program. It's a unique, flexible application development environment that makes it simple to deploy applications to multiple users at multiple sites.

Plus, Notes brings people together

across different network operating systems (3Com®, IBM®, Novell®, Banyan®) working on different platforms (Microsoft® Windows, OS/2® with Presentation Manager™) anywhere in the organization. Not to mention anywhere in the world.

After all, most companies looking for an innovative way to be more competitive are beginning to recognize a simple fact. That connected people and coordinated workgroups are what actually make a company more competitive. So let Lotus Notes capture it all, from an informal project discussion to a global brainstorming session.

To find out how Lotus Notes can help your company increase its productivity by getting more out of its LAN-based applications, call **1-800-872-3387, ext. 6369.**

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- Training scheduler
- Help desk



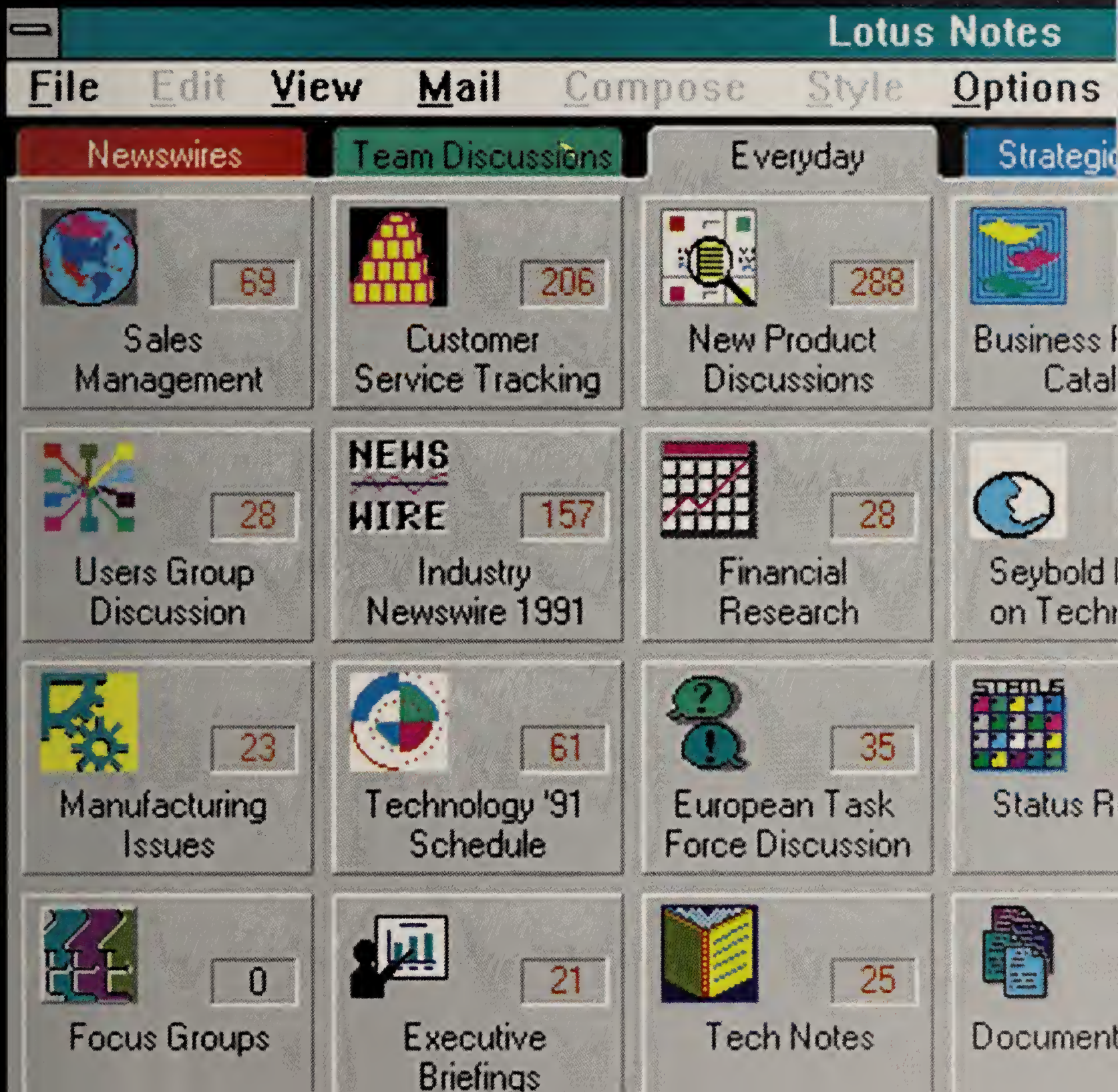
"Notes is a precedent-setting, precedent-shattering product."

—Jim Seymour, PC WEEK

Lotus Notes

Lotus

wanting to increase vity are taking Notes.



Case Study: CMS Helps AT&T Develop Proposals

The Proposal Development Engineering Department of AT&T is faced with a common business problem — submitting bids to the U.S. Government. This involves a very strict set of requirements. It also involves meeting stringent deadlines. A proposal that misses a deadline will not be accepted.

According to Jeanne Cooke, network administrator in AT&T's Proposal Development Engineering Department, "If we are one minute late with our proposal, it will not be considered. So our deadlines are for real, and that makes for a very intense work environment." In that environment, Cooke and her colleagues are always trying to work more quickly and efficiently toward the goals of putting out the best proposal at the lowest internal cost.

Since establishing a publishing resource center and adding the Change Management System (CMS) document management system from Workgroup Technologies, Inc., they are finding it much easier to meet those goals.

CMS

Proposals are written by technical writers from Bell Labs who are sent to the publishing resource center for 90 days and assigned a section or several sections of a proposal. They write on PCs with the word processing software of their choice. They then export their work into ASCII files, sketch out the necessary graphics and give them to illustrators. The

illustrators then draw all the graphics and export them into Framemaker. At the same time, the page make-up artists also import the ASCII text into Framemaker, bringing text and graphics together to makeready for printing.

Since few proposals are designed from scratch and time is of the essence, writers frequently seek access to previous proposals and other sections of the proposal they are currently working on.

"If ever there was a competitive advantage in time-sensitive publishing, it's got to be this. We could never go back to the old way. We haven't missed any deadlines since we got the system."

— Jeanne Cooke
Network Administrator, AT&T

Avoiding a Ground-Up Approach

"It's as though you wanted to update your resume, and you had a book of resumes to look through for new styles and formats until you found the one that suited your need," Cooke says. "That's what we wanted to do with proposals. Proposals are tricky because they are not static and they are not general. Only the most general of for-

mat will apply from one to the next."

Change control was a major problem for the department. A number of unsatisfactory approaches were taken before CMS was installed. For example, every time a sketch or a request for a "make-from" arrived, it was first assigned a new control number. Also noted was who assigned it, who received it and the date it came in. The assignment was then passed off to the illustrator, who drew it and pasted it onto a printed page. All changes were made manually. This process took far too long and could not be easily controlled.

Select the First Pilot Carefully

Users need not restrict themselves to just one application; in fact, many successful workgroup application pilots have automated two activities simultaneously. If there are four or five business problems to be solved tactically, it is wise to start with an off-the-shelf product before launching into a more resource-intensive customized development effort.

However, if only one of the problems can be solved with an off-the-shelf product, the experience gained by implementing it will not prepare the user to address remaining or follow-up problems.

An issue to consider in this scenario is what IDC calls the "killer success factor". This theory is based on the premise that

success can be a bigger killer than failure. It comes into play after a user experiences initial success with an off-the-shelf product. At that point, there is a great deal of pressure on that user to implement a more complicated, strategic workgroup project without the benefit of a pilot. These high expectations may be difficult or impossible to meet.

In order to avoid this scenario, select a vital application with strong user support for the initial workgroup implementation. Set realistic expectations on the part of users and require reasonable resources from management.

Assemble the Team

Having determined the first applica-

tion or applications, the next step is to assemble the implementation team. Try to achieve a balance of backgrounds so that no one discipline overwhelms the team. It could be argued that if an off-the-shelf product is used, a team is not necessary. However, it should be noted that capturing knowledge of the process may be a measure of success, and this can be better done with multiple people involved. In addition, workgroup computing by definition is a team event, so the sooner a team is formed, the faster benefits will be derived from the project.

Workgroup applications are generally group or department oriented, but IS should be involved in their implementation processes.

Workgroup Technology: Tying Technology to Business Objectives

Implementing With Care

Two years ago, due to the near chaos of the old system, a decision was made to automate the proposal publishing process. But the changes had to be implemented carefully. According to Winston Hodges, department supervisor, "If you're going to turn a product loose on technical writers who are only going to be down here for 90 days, you have to have your act together. It needs to be pretty simple."

AT&T had to do a cost justification for CMS. As part of that effort, the proposal center developed a baseline from which it could measure improvements. That was difficult without any automated means to gather data. Now, however, CMS gathers its own metrics.

Once CMS was chosen, the department began automating functions one at a time. Since the labor-intensive graphics are the most expensive part of producing a proposal, they were automated first.

Illustrators are responsible for the most changes in the production process. When they receive a new drawing, or a "make-from", they assign it a control number and add it to the system. They organize their work by setting up classes. Each proposal is considered to be a class. Each class contains volumes, e.g. management volumes, technical volumes and summary volumes.

Tracking Previous Versions

In the course of their work, illustrators check out drawings for changes, and then check them back into the system. Anyone working with the proposal can determine the exact status of every illustration at all times. CMS also automatically tracks previous versions, any of which can also be accessed at any time.

Initially, there was resistance to the new system, particularly among the illustrators, who thought the system required extra clerical work that shouldn't be part of their jobs. They changed their minds, however, when the system went down and they had to revert to the old manual process. Their sup-

port for the new system grew even stronger when a proposal that had been done just prior to installing the new system came back for additional work. The proposal was so unorganized the illustrators had to redraw a number of the graphics in it.

Users Want More

The success of the system has made users hungry for more. The proposal department would like a simpler user interface to accommodate not only the illustrators, who are technically savvy, but also managers, who will never open a manual, and writers, who are only on location for a short time.

In addition, the management reports need to be improved — a common need among many Structured Query Language database-driven products. There is also a need for more platform support, particularly for Macintoshes and PCs running Windows.

AT&T believes the automated system will become even more important to the technical documentation specialists because the U.S. Government's Computer-Aided Logistics Support (CALS) initiative specifying technology standards for government contracts has a database-document management portion.

Finally, the department is actively investigating developing its proposal catalog, so that all best-of-class proposals — which cover various formats that recur from proposal to proposal such as manufacturing facility capabilities — can be easily accessible to the writers.

AT&T has some succinct advice for prospective users of workgroup systems: do as much planning up front as possible and evaluate the software by getting an actual copy and trying it out.

"If ever there was a competitive advantage in time sensitive publishing, it's got to be this," says Cooke. "We could never go back to the old way. We haven't missed any deadlines since we got the system."

Evaluate the Scope

There are several questions to ask here: Is the project best served by a pilot? Is the group small enough? Is the group motivated? This is also the point when the user puts boundaries around the project, boundaries that can not be violated.

Group size is critical. In a Fortune 100 company, a 150-person group might make a pilot workable, while for a smaller company, a six-person group may be more appropriate.

The amount of resources available is also critical. Is there a full-time LAN administrator who has time to delve into the application layer? Or will the user depend on an overworked IS staff member?

Finally, and most importantly, is there

an established LAN and are there wide area communication links to remote offices?

On the organizational side, consider the common work done by members of the targeted project group and their computing experience. If everyone performs the same type of task and has similar amounts of computing experience, training and implementation is easier. It is more likely that a diversity of tasks will be represented.

Make sure that the application selected for workgroup computing has some degree of replicability, thereby ensuring a quicker learning curve. It is also important to ensure that the knowledge gained in this process remains within the compa-

ny and does not walk out the door with a consultant.

Quantify the Benefits

Even though some benefits are very difficult to quantify, it is necessary to provide some measure of financial return in both hard and soft dollars. On the soft-dollar side, include the knowledge gained through the implementation process because individuals that acquire this knowledge will have a higher corporate value.

It is important to measure some baseline information before the workgroup project is implemented. Such information may include the time required to complete documents and respond to cus-

customer inquiries. It may also include the number of requests for support information from customers or salespeople over a given period.

Soft-dollar savings also include improved morale, the ability to accomplish cross-training of individuals, improved communication and greater access to information. The soft-dollar factors are generally best measured through employee surveys.

Generally, if users are spending 25% of their time either looking for information or accessing it, a workgroup automation application can be cost-justified.

Process Analysis

The first step in the process analysis is building a series of charts. The first chart should

describe the basic overall activities to be accomplished. A second chart should describe the same process, but be based on a best-case, least-complex approach. The third chart should describe a worst-case scenario. Each chart is then placed through the same task-analysis process.

This involves taking each step in the chart and breaking it into a series of tasks. Wherever feasible, determine how many users are required to complete each of the tasks. The idea behind this process is to identify the commonality of tasks being performed by workers so that the proper workgroup software can be selected.

Reformulating the Process

One of the significant benefits of workgroup computing is the greater understanding that is gained of the business system being automated. Shining a new light on old systems frequently results in tremendous benefits.

Unless a process analysis is completed down to the task level, the concept of re-engineering, or reformulating — a term IDC prefers, since few business systems were engineered in the first place — cannot be accomplished.

This process requires that common tasks be identified and the workers who perform them be interviewed. The pur-

pose of these interviews is to determine the value of steps involved in the tasks.

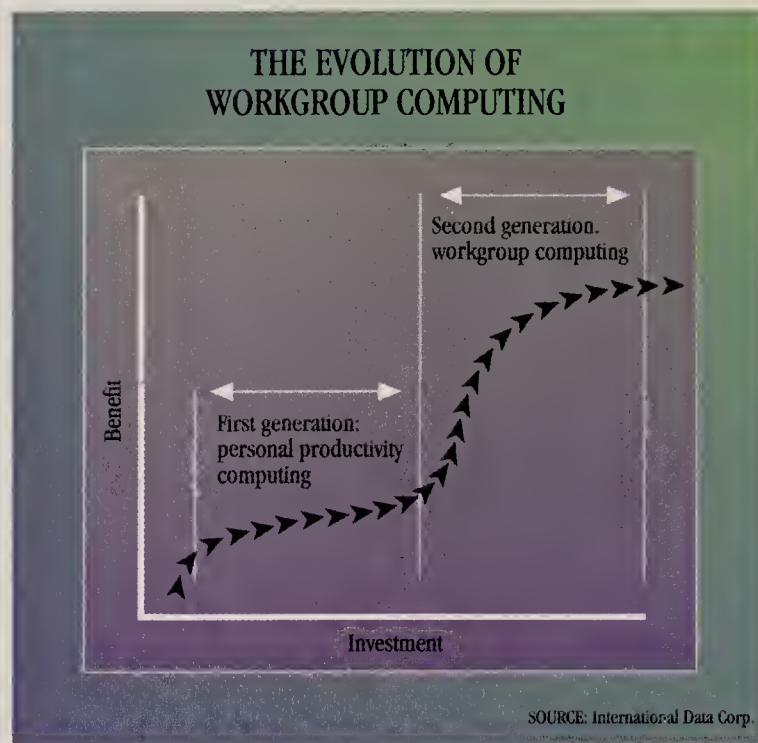
This is one stage of the process where consultants can be very valuable. Good ones are objective, have excellent analytical skills (particularly if the project is well-contained), and can gain insight into how the process actually takes place as opposed to how company management thinks it happens.

Systems Analysis

In order to avoid acrimony between users who want more features, and IS, which must contain user demands, functional requirements can be generated by the process/task analysis approach. Using this process, both users and IS can see the functions that are needed as opposed to those that are not. The team can then determine the cost and time to provide a baseline product, as well as the incremental cost of adding other features and functions.

The Buy-In

Although up to now very few workgroup systems have stemmed from a formal Request for Proposal (RFP), going through a streamlined proposal request process is very helpful, even if the RFP is never issued. Such proposals enforce structure and discipline on the group.



The benefits of personal productivity and workgroup computing are growing as more resources are invested in them.

Most importantly, they ensure that there is an internal management buy-in, and that everyone else involved also signs off. Without this process, people can end up feeling that they had no input into the final decision.

Another benefit of issuing an RFP is that it sets a deadline for information gathering. Without deadlines, the process can degenerate into a series of undirected meetings with no conclusions.

Vendor Selection

The decision on whether to work with a systems vendor, software vendor, systems integrator, VAR, and/or a consulting organization is influenced by a number of factors. One is whether workgroup computing will be used from a strategic or

tactical perspective. Others include the availability of internal resources, the nature and scope of the first application, the current automation environment, the future automation architecture, the future application automation plans and the anticipated internal growth rate of workgroup technology.

For those companies with very limited internal resources that see the need for simple tactical solutions, some combination of consulting and VAR relationships is best. For those taking a strategic tack and expecting a high rate of growth, a software or systems vendor will make the best partner.

System Implementation

A schedule of activities that will have to be addressed during implementation includes:

- Application design
- Pilot
- Training
- System testing
- User acceptance testing
- Feature and function review
- Final application development
- Pilot number 2
- Second round of training
- User acceptance retesting
- Support
- Sign-off to the vendor

Case Study: Dell Uses Notes at Home and Abroad

Efficient communication is more than a priority at Dell Computer Corp., it is a way of business life, and has been since the company's founding. Based in Austin, Texas, Dell designs, manufactures, sells, services and supports all types of personal computers.

To meet its diverse communication needs, Dell relies on Lotus Notes, a document-oriented database used for building applications that enable workgroup communications and information sharing.

Notes was first implemented at Dell in mid-1990 when the company committed to 200 licenses.

Initially, the software was used to create an issues database for Dell software development projects. Dale Reynolds, Dell's vice president of product development, was so impressed with Notes' ability as a collaborative platform for sharing software development ideas, that he moved quickly to establish an issues database for the company's hardware projects as well.

Using "Core Teams"

Dell develops products through "core teams" that include representatives from all relevant areas of the company. These teams share information about issues affecting their products — anything from technical problems and difficulties with suppliers, to scheduling questions and international concerns. Prior to Notes, information on issues was communicated both through paper reports and weekly updates.

"Notes offered immediate benefits," says Paul Guinn, Dell's Notes project manager. "Users shared information quickly instead of having to wait a week, which can be an eternity in product development. Notes also made collaborating on an issue easy and efficient by formalizing message issue and response activity. And the flexibility of Notes' data views made it easy to track open issues at a glance."

With both hardware and software development teams using Notes to share and discuss issues of concern, Dell quickly discovered another important feature of the software — its ability to stimulate users' creativity. According to

Guinn, "Notes is extremely user-driven. There's a serendipity about it. Users set out to do one thing with it and wind up discovering 20 new uses." Some of those new uses have been translated into critical applications. They include:

NotesBooks — Each database ("book") contains all the information relevant to a single project or a group of Dell hardware or software initiatives. NotesBooks centralize project concepts, market requirements, specifications, schematic designs, testing information, reports, engineering changes, schedules, risk analyses, job descriptions and other project information. They not only allow project teams to share this vital information instantly, but also represent an invaluable resource for Dell's Current Systems Group, which "owns" all Dell products from the time of shipment to the end of their product life.

Product Plan — This database contains brief descriptions of all Dell development projects, as well as anticipated schedules and a list of project managers. It improves Dell's strategic planning by disseminating this information instantly among senior management and fostering group discussion whenever issues arise. Prior to Notes, senior management received this information monthly via paper reports that were often already outdated, especially for Dell's international business units.

Implemented in stages at Dell headquarters, Notes became available to the firm's international business units in September, 1991. The addition of these international licenses brought the total number of Notes users at Dell to 725, about 625 of whom work at the company's headquarters.

Dell has taken a creative multi-level approach to meeting its communication needs. "People often take a myopic view of technology," explains Reynolds. "When we first introduced Notes, many people couldn't understand why we were upgrading to 386 PCs to accommodate it. But once they spent thirty minutes with a Notes database, their eyes lit up and they asked where we'd been hiding the system. Notes causes people to experiment, which has brought about a real culture change in our organization."

*"Notes offered immediate benefits.
Users received information quickly,
instead of having to wait a week.
Notes also made collaborating on an
issue easy and efficient."*

—Paul Guinn
Dell's Notes Project Manager

POST IMPLEMENTATION ANALYSIS

After implementation, wait two or three months and then analyze the project. Start by determining whether or not the anticipated benefits from the system

are being realized, and make sure results are documented. The next step is to review the overall implementation process to determine how it could be improved. Team members should continue to meet

and assess the workgroup system.

Remember, the project is never over until you say it is over.

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Lotus

Borland's Objectvision 2.0: Much improved

Technology Analysis — A roundup of expert opinions about new products. Summaries written by freelance writer Suzanne Weixel.

Borland International, Inc. has greatly improved its already innovative Objectvision object-oriented applications development package with Version 2.0.

Ease of use: Language-oriented programmers may find Objectvision cumbersome. Still, Microsoft Corp. Windows resources, such as buttons and bit-mapped images, are easy to use. Complex applications run slowly, however, and there is no compiler or report writer.

Forms creation: The flexible forms system was designed to create front ends to databases.

Data access: The package has links to Paradox, dBase, Btrieve and comma-delimited ASCII files. Plans are in the works for a SQL server as well. New to 2.0 is support for scrollable database tables that may be placed anywhere within a form.

Programming functions: Objectvision provides strong program control methods. Programs can take action based on the value of variables or on the flow of events.

Value: Objectvision delivers a powerful, if different, development environment. It lists for \$149.95, including a royalty-free runtime module.

Borland's Objectvision 2.0

Reviews	Ease of use	Forms creation	Data access	Programming functions	Value	Overall
<i>Infoworld</i> 11/18/91	Some functions not intuitive	Simpler	Greatly improved	Better decision trees	Worth learning object-oriented style	Best use of objects
<i>PC Week</i> 11/18/91	Visual programming can be cumbersome	Beyond simple forms	Strong support for databases	Many improvements	Many useful new features	Far more powerful than 1.0
<i>PC Magazine</i> 1/28/92	Supports new types of objects	Streamlined	Unchallenged capabilities	No programming experience needed	Example of how you can improve	Distinctive product
Users						
Robert Sherman, Underwriters Laboratories, Inc.	■	■	■	■	■	Easy to get at data
David Randolph, Shared Logic, Inc.	■	■	■	■	■	Excellent accessibility for end users
Maryann Hewett, Charles Schwab & Co.	■	■	■	■	■	Intuitive, interactive, quick
Michael Weinberger, U.S. House Appropriations Committee	■	■	■	■	■	Complete, easy to use
Analysts						
Karen Offermann, Datapro Research Corp.	■	■	■	■	■	Excellent interoperability
Peter Francis, Dataquest, Inc.	■	■	■	■	■	One of Top 2 GUI tools

Key: ■ Very good ■ Good ■ Fair ■ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance
Michelle Preston and Jeff Bernstein, Cowen and Co.	■	■
Timothy McCollum, Dean Witter Reynolds	■	■

Borland reported 1991 revenue of \$226.8 million and profits of \$26.8 million, a 127% increase over 1990.

Borland responds

John Mandell, product marketing manager:

Ease of use: We do not have a compiler because we compile each thing as we go along — a sort of compiler-on-the-fly. We are announcing a third-party add-on report writer to ship in mid-April.

Data access: We started shipping the SQL connection last month. It is an add-on that costs \$7.95, including unlimited runtime.

Asymetrix's Toolbook 1.5: Easier and faster

Asymetrix's Toolbook 1.5

Reviews	Ease of use	Forms creation	Data access	Programming functions	Value	Overall
<i>Infoworld</i> 8/26/91	Excellent	Much improved	Windows 3.0-compatible	Sophisticated programming system	Very good	8.9*
<i>PC Computing</i> 8/91	Easier to learn	NC	Good as DBMS front end	Sample applications added	Worth a look	Dramatically faster than 1.0
<i>PC World</i> 7/91	Faster file searches	NC	Graphics formats added	New, enhanced functions	Double-barreled upgrade	Most successful hypercard-like environment
Users						
Gerald Rossi, Graph Valley Group, Inc.	■	■	■	■	■	Complete
Tom Herchek, Softswitch, Inc.	■	■	■	■	■	Still slow
Maria Nugent, Canadian Imperial Bank of Commerce	■	■	■	■	■	Could be faster
Analysts						
Karen Offermann, Datapro Research Corp.	■	■	■	■	■	Not as deep as other tools
Peter Francis, Dataquest, Inc.	■	■	■	■	■	Improved
John Dunkle, Workgroup Technologies, Inc.	■	■	■	■	■	Performance needs work

Key: ■ Very good ■ Good ■ Fair ■ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment. **Infoworld* ratings based on a 1-to-10 scale.

Vendor background information

Toolbook is the primary product for Asymetrix, based in Bellevue, Wash. The product's estimated installed base is 70,000 copies, according to the company. Toolbook is marketed in Europe as well as the U.S., along with the company's new Windows-based applications. A privately held firm, Asymetrix does not disclose financial information.

Asymetrix responds

Steve Blair, product manager:

Ease of use: Every software product could be faster. But, for the most part, speed is not an issue for the people who use Toolbook because they are not incorporating heavy-duty scientific processing.

Programming functions: We use intuitive constructs, which are different from Hypertext.

Not quite object-oriented, Toolbook from Asymetrix Corp. is trying to find a niche in the Microsoft Corp. Windows applications development arena, reviewers said. Version 1.5 is a leap forward, but there is still room for improvement.

Ease of use: With a Hypercard-like metaphor of pages and books, Toolbook 1.5 is easy to use. Integration into Windows is complete, and setting object properties is a snap.

Forms creation: Pages include such objects as buttons and dialog boxes in the background and foreground. Scripts are attached to create an application. The objects can have user-defined properties.

Data access: Windows metafiles, .EPS and .TIFF files can be imported directly. Toolbook can also import external code libraries and program segments in Windows 3.0-compatible languages.

Programming functions: The Openscript programming language can be clumsy and complicated at times, reviewers said. Scripts can be up to 60K bytes; each book page can contain 64K bytes of objects. There is context-sensitive Help for the programming language and an application for building presentations.

Value: Toolbook 1.5 has a complete feature set. It is good for novices and for building prototypes or front ends to database systems. It lists for \$395.

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WORKGROUP COMPUTING

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IN BRIEF

Microsoft delivers kit

■ **Microsoft Corp.** has announced the shipment of its SQL Server Resource Kit, which includes a variety of utilities and technical information intended to help SQL Server Version 4.2 customers manage Windows-based client/server applications. It includes information on the cursor application programming interface, customer assistance, SQL Server 4.2 components and a description of Open Data Services. Code samples and utility programs are also included.

■ A client/server document filing and retrieval software package has been unveiled by McLean, Va.-based **Excalibur Technologies Corp.** Pix-Tex/EFS ServerPlus includes a graphical user interface under Microsoft Windows, a "file-room metaphor" and the ability to access Digital Equipment Corp.'s Rdb/VMS database manager to file and retrieve documents.

■ **Novell, Inc.** reorganized its sales department this month, pulling its worldwide sales department into its Corporate Services Group. Mary Burnside, executive vice president and head of the group, will gain control of sales as well in the shuffle. Dick Williams, executive vice president and general manager of Novell's Desktop Systems Group, will be taking on development work between Novell and IBM as part of the reorganization.

■ **Motorola, Inc.** has announced that it has chosen **Fujitsu Computer Products of America**, a subsidiary of Fujitsu America, Inc. in San Jose, Calif., as the supplier of 3½-in. disk drives for its line of multiuser and real-time systems and servers. The agreement calls for Fujitsu to supply M2626 drives for Motorola's Delta series, Multipersonal Series 8000 and DeltaRt systems.

IS managers admit downsizing fears

BY ELLIS BOOKER
CW STAFF

CHICAGO — Despite evidence that downsizing is a potentially cheaper, faster way to do corporate computing, many information systems professionals are taking a conservative approach when it comes to adopting the new paradigm.

Several attendees at the Downsizing Expo held here recently said that while they are on the brink of moving some mainframe applications to client/server architectures, no mission-critical programs are involved.

Instead, the focus is on downsizing isolated "report on the business" applications such as decision support and human resources programs. The reasons behind this caution range from the purely technical — for example, the worry that local-area

networks and high-performance servers are not yet as robust as a mainframe — to a lack of familiarity with the applications development software and LAN technology used in downsizing projects.



Another important impediment is cultural, reflecting IS departments' own wariness at reorganizing, said analysts and some users attending the expo.

"Right now, 80% of the staff is supporting the mainframe, which is 20% of our future need," said Leonard Gaede, associate director of programming and automated operations at Judicial Management Information Services, which runs computer operations for Illinois courts from the state capital of Springfield.

At the moment, Gaede is struggling with how best to connect about 1,000 primarily

stand-alone personal computers and some eight pilot LANs deployed statewide.

Regardless of the types of applications being downsized, cost
Continued on page 60

Client/server focus

Several vendors used the Downsizing Expo to spotlight client/server offerings, including the following:

- **Computer Associates International, Inc.** unveiled updated versions of its CA-Realia line of tools for use in the PC LAN environment. The new releases include a mainframe-compatible Cobol tool as well as CICS, IMS and DL/1 emulators and an assembler/debugger for IBM System/370 programs. Pricing for the new releases (currently in beta testing) range from \$995 to \$1,695 per copy.
- **Hewlett-Packard Co.** disclosed an agreement to port three Software AG of North America, Inc. development products for Unix — Adabas, Natural and Network — to the HP 3000, with availability expected in the fourth quarter of this year.
- **AST Research, Inc.** showed a demonstration model of its first symmetric multiprocessing Unix-based system. The AST MicroFrame features a 64-bit backplane connected to a 32-bit, Extended Industry Standard Architecture I/O bus. Slated to ship this summer, a base system with 16M bytes of memory will sell for less than \$25,000, AST said.

ELLIS BOOKER

Zilog creates ZOMBIE for network strategy

BY MICHAEL FITZGERALD
CW STAFF

CAMPBELL, Calif. — Zombies typically conjure up scenes from bad horror movies, but officials at Zilog, Inc. are thinking mainly of the business advantages of creating their own ZOMBIE.

Zilog Office Management Business Information Enhancement (ZOMBIE) is the result of a 4-year-old decision to move away from a mainframe and minicomputer environment — IBM mainframes, Hewlett-Packard Co. 3000s and Digital Equipment Corp. MicroVAX IIs — to an open systems-based network running Unix.

Under ZOMBIE, Zilog focused on building the communications aspect of the network first and is now upgrading the hardware. Two years ago, the company bought an AT&T 3B2 minicomputer to serve as the network's base, and now it is replacing the HP 3000s with two dual-processor AT&T Starservers Es.

In addition, Zilog-built 100s and 300s, left over from the days when Zilog was a hardware vendor, are being replaced with uniprocessor Starservers and NCR Corp. System 3445s. Dumb ter-

minals hang off the servers.

Bobbi Bogue, director of information and computer services at Zilog, said she wanted the network built first, before making major investments in hardware, because she believed that Unix would become a workable solution and hardware prices would drop sharply.

"We absolutely had to make a leap of faith," Bogue said. Now she said she feels vindicated that she chose to build the communications links first because of the money Zilog is saving on hardware expenditures.

"There were so many folks, both external and internal, who said we should get hardware, and we said we're going to build a network, which people don't really see and touch," she said. "People went out and spent a lot of money on hardware [in the last couple of years], but they didn't go back and look and see how to tie it all together. We tied it all together, and we're now enjoying the fact that computers are cheaper; they're commodities."

Open lines

In 1992, as Zilog continues to build ZOMBIE, it will put heavy emphasis on a sales automation project called ZTOOL, motivat-

ed in part to improve communications between Zilog and its far-flung customers.

As a maker of integrated circuits used in a variety of devices from computers to toasters, Zilog has customers worldwide. Bogue said she picked AT&T's Safari notebook because of its communications capabilities and potential. Zilog rolled out \$300,000 worth of these laptop systems to its 65 sales representatives in July.

"Our first goal is communica-

tion: We would like to know every time they touch a customer. We would like to know immediately if there's a problem with the customer or a need to service. It's our goal to have any message anywhere in 15 minutes," Bogue said.

She added that the company so far has used the laptops as communications devices in order to let the sales representatives adjust to the new technology.

Despite the limited use of the systems, Bogue said, improved turnaround time has allowed Zilog to capture \$3 million to \$5 million in sales that it might otherwise have lost.

More to come

Later this year, Bogue said, she intends to roll out three new applications for the laptops: pricing, product data sheets and data forecasting.

The salespeople will interact with databases on the ZOMBIE system, particularly the dual-processing Starservers, which will run a multiprocessing version of Oracle Corp.'s namesake database.

All the computers are linked by Transmission Control Protocol/Internet Protocol running over Ethernet networks at Zilog's plants and corporate offices — tied together with digital 56K bit/sec. and T1 lines over a virtual private network domestically — and connecting to off-continent points through an X.25 service bureau.

ON SITE



Zilog, Inc.
Campbell, Calif.

- **Challenge:** Communicate more effectively with international sales force; improve customer service and efficiency.
- **Technology:** Multiprocessing AT&T Star servers running Unix replace old Zilog-manufactured servers; Safari laptops assigned to sales representatives.
- **Results:** Plan is in pilot; work force reports improved communications and customer support and speedier order filling.

Cambex seeks fresh service market in RS/6000s coming off warranty

BY MARYFRAN JOHNSON
CW STAFF

WALTHAM, Mass. — With thousands of IBM RISC System/6000s now rolling off their one-year warranties, storage vendor Cambex Corp. leapt into the service breach last week with a new partnership with Bell Atlantic Corp.'s Business Systems Services.

Bell Atlantic's computer services group, based in Frazer, Pa., will provide on-site maintenance for Cambex's line of RS/6000 storage peripherals at rates 30% to 50% less than comparable IBM service, company officials said.

Cambex or its authorized distributors will provide first-call problem determination and then dispatch Bell service technicians to user sites, as needed, from 7 a.m. to 6 p.m. on weekdays.

In the past, on-site service for Cambex products has been available only in large cities, such as Los Angeles and New York.

The company expects 75% to 90% of its current customers to

contract for the expanded coverage, said Barbara Robidoux, product marketing manager at Cambex. "We haven't been losing accounts over this issue, but some have been stalling further purchases until they had an answer from us," she said.

Yet the reliability and price of the hardware — from both IBM and Cambex — make maintenance contracts a questionable expenditure for some, according to users interviewed last week.

Cheaper to stockpile parts

"Most of the stuff is getting so cheap, you're better off buying some spares rather than putting it under maintenance," said Dave Beckedorff, senior portfolio manager at Panagora Asset Management, Inc. in Boston, which uses memory and disk products from Cambex on an RS/6000 Model 320H.

"I think for most of Cambex's accounts it will be helpful for them to provide maintenance support, but it's not really a consideration for us," he added.

Cambex currently markets

20 storage products under the Certainty Series name for the RS/6000 market, including disk drives, tape subsystems and memory hardware products as well as Certi-Stream and Certi-Stor software for disk backup and mirroring functions.

Earlier this month, the company announced an RS/6000 tape duplication software product called Certi-Copy, which enables users to simultaneously duplicate up to eight copies of magnetic tape information. Duplicate tapes are routinely used for distribution at user organizations as well as for backup and archiving.

At Harnischfeger Corp., an industrial manufacturer in Milwaukee, a network of 90 RS/6000s is being equipped with Cambex memory and external disks as the company migrates from an older IBM 3084 mainframe. The attraction of the Cambex peripherals was their 30% to 40% lower cost compared with IBM offerings, said Chuck Hemann, manager of engineering computer operations.

Managers admit fears

CONTINUED FROM PAGE 59

pressures are in large part moving these departments inexorably toward this future — like it or not. "Our [IBM] 4381 is just out of gas, and the next upgrade is \$4 million," said Steve Ruane, manager of computer-aided manufacturing at Batesville Casket Co. in Batesville, Ind. "We'll either learn to downsize, or we'll outsource."

The world's largest maker of burial caskets, with revenue of \$1.2 billion last year, Batesville has already identified a decision support system it hopes to put on a Unix-based server during the coming months. Because the system will put report-writing tools directly in the hands of users, a side benefit of the project is that it ought to allow four of the IS department's 35 workers to focus on other applications. "It'll be like getting four guys for free," Ruane said.

At American Drug Stores, however, cost control is not the driving influence. Instead, the company is evaluating a move to client/server because of the features it believes only that architecture can provide.

Russell Norman, a project manager at American Drug

Stores in Oak Brook, Ill., said the company has limited experience with LANs, but it already has substantial Unix know-how, having deployed over 1,000 NCR Corp. Unix servers in its stores.

User pressure

Pressure can also come from below, as users ask for functions that are either unavailable or too expensive to deliver from the mainframe.

"Our literate users see what's out there, what kinds of applications can be built in PC software," said Gary H. Strawbridge, manager of systems planning at General Electric Capital Corp. in Barrington, Ill.

The core applications on the GE unit's IBM 3090 mainframe are 10 or 12 years old, Strawbridge said, adding that some kind of PC front end for the mainframes will likely be the company's first step.

Despite all the hesitation, interest in the topic of downsizing seems high. Officials at Digital Consulting, Inc., the Expo's Andover, Mass., organizer, reported 600 attendees for the two-day conference, up from 400 last September.

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Artisoft package challenges NetWare with printer control, management

BY JIM NASH
CW STAFF

Network administrators are largely applauding Artisoft, Inc.'s recently introduced LANtastic Version 4.1, which Artisoft is pushing as an alternative and eventual successor to Novell, Inc.'s NetWare 2.2.

Tucson, Ariz.-based Artisoft has gone on the offensive with features such as improved printer control and system management to enter the window of opportunity created by Novell's flip-flopping on its intention to update NetWare 2.2.

LANtastic is peer-to-peer network software for up to 300 IBM-compatible personal computers. With Version 4.1, Artisoft has added print queue controls, which store print jobs on end users' disks, allowing them to start, stop and restart printing assignments. LANtastic's System Manager utility has been enhanced to enable managers to install new network software from their PCs.

"I'm very comfortable with

it," said Warren Stone, a computer consultant currently working at Crestview Financial Group in Beverly Hills, Calif. A newcomer to networking, Stone said he had never installed a network before last fall when he helped

WITH VERSION 4.1, Artisoft has added print queue controls, which store print jobs on end users' disks.

Crestview bring its LANtastic 4.0 system up. "I feel like I could bring anyone up on LANtastic now," he said.

The company's 25-workstation network "hasn't locked up once" since installing Version 4.1 two months ago, Stone said. He added that he has run into some problems with printing, but he is not sure it is LANtastic's fault. Print jobs occasionally

collide, resulting in two documents merging on one page. He said he is investigating the problem.

Others report satisfaction with their print capabilities, however. Fred Harper, direct marketing manager and network administrator at Dymerc International in Costa Mesa, Calif., said the new version gives him "post-print management." Harper said the software was loaded onto the value-added reseller's eight-workstation network three months ago.

End users can call up a menu that tells them who printed a document, how many pages it was and other information. Because the print job is stored on their PC, they can easily order it to be printed again.

"Our experience has been very favorable," Harper said, but he stressed that future versions should have communications services. "We need to share serial printers and modems, and we'd like to see [this capability] embedded in LANtastic."

NEW PRODUCTS

Utilities

Sytron Corp. has announced that Sytos Plus for OS/2 now supports Microsoft Corp.'s SQL Server Version 4.2.

The product allows users to perform on-line database and transaction-log backups over a local-area network. It can perform automatic or dynamic backup. The software costs \$295.

Sytron

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Westboro, Mass. 01581
(508) 898-0100

Gateways, bridges, routers

Miramar Systems, Inc. is shipping a software gateway for integrating Apple Computer, Inc. Macintosh local-area networks with personal computer LANs.

MacLAN Connect for NetWare can act as a gateway to multiple Novell, Inc. NetWare servers. Multiple Macintosh users can connect simultaneously through a single NetWare session, effectively expanding the allowable number of concurrent NetWare users. Access to files residing on PCs is transparent to the Macintosh user.

The software runs on a dedicated PC. Pricing is \$695 for 40 users.

Miramar Systems
Suite 204
201 N. Salsipuedes
Santa Barbara, Calif.
93103
(805) 966-2432

Local-area networking software

Pacer Software, Inc. has announced its Data Access Language Server for Unix, which provides Apple Computer, Inc. Macintosh users with access to data stored on Unix systems.

Access is transparent to the user. A variety of Macintosh applications, including spreadsheets, query tools and client/server applications development tools, can serve as front ends to data on Sun Microsystems, Inc. and Hewlett-Packard Co. HP9000/800 systems.

Pricing ranges from \$4,000 for up to 16 users to \$12,000 for unlimited user access.

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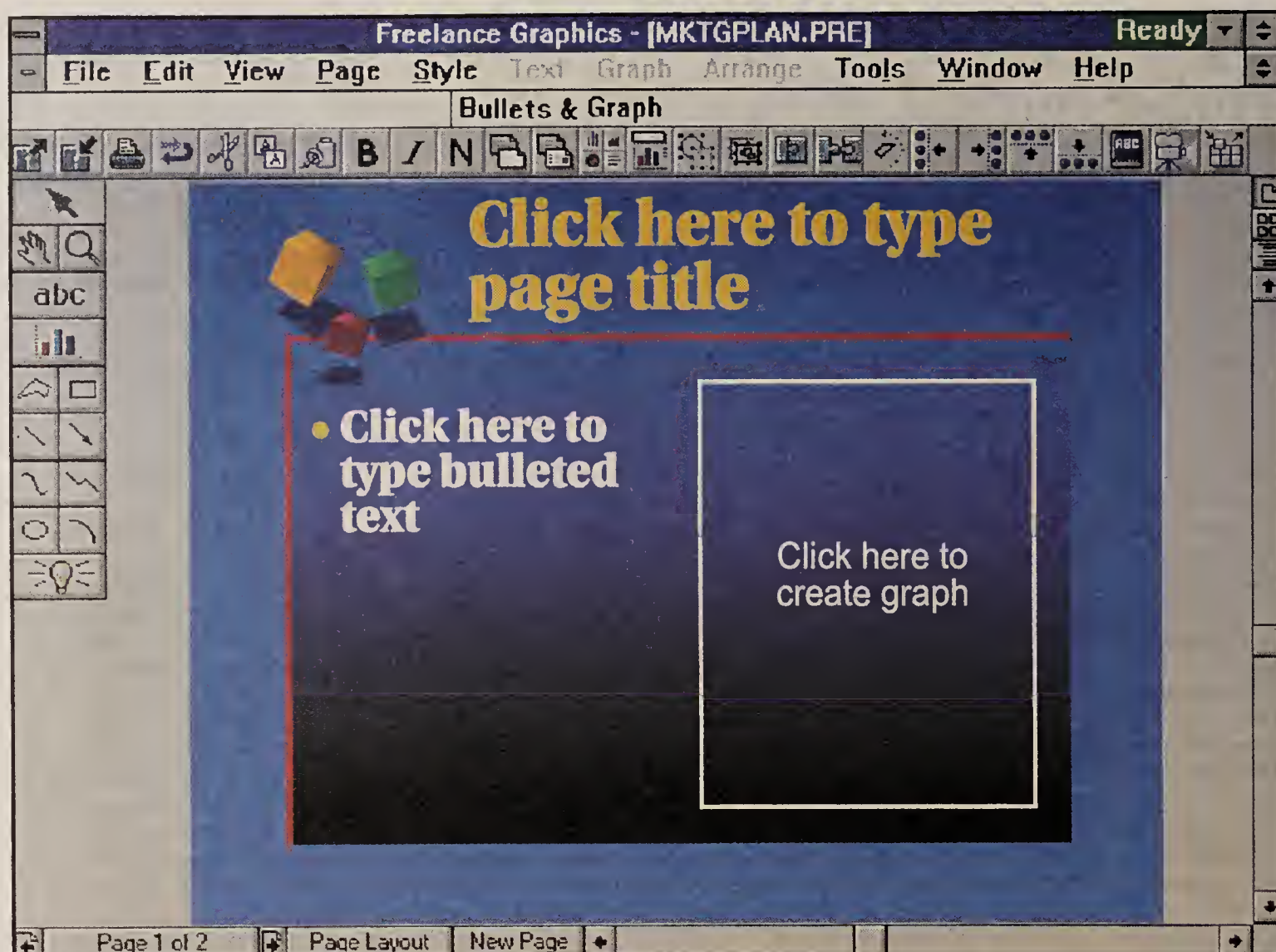
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Remedies here for melding SNA nets, LANS

BY JOANIE M. WEXLER
CW STAFF

As IBM nears completion of its Advanced Peer-to-Peer Networking (APPN) product rollout for migrating host-centric computing environments to LAN internetworks, other vendors are falling in line to help users cost-effectively collapse their parallel networks.

Recent moves toward meeting this growing challenge include a wiring hub concentration approach announced last week by internetworking vendor 3Com Corp.

Earlier this month, Hewlett-Packard Co. announced software allowing its computer platforms to access an IBM Systems Network Architecture (SNA) environment through a single local-area network gateway [CW, March 16].

The developments speak to user desires to blend hierarchical IBM SNA networks with the inherently different characteristics of peer-oriented LANs in order to provide all users with access to computing resources companywide.

Those desires have been inching ahead of available remedies as large SNA shops have seen LANs proliferate in their organizations, said Steve Randesi, chairman of Gen2 Ventures, a consultancy in Saratoga,

Calif., and co-author of a recent report, "Internetworking with the New SNA."

One major challenge to providing solutions is that few vendors have expertise with both SNA networks and LANs, he said. For example, "a LAN vendor might think that SNA carries too much overhead. However,

processors, as well as a new version of its mainframe subarea software that will allow SNA and APPN to coexist [CW, March 16].

In addition, 3Com's neophyte IBM networking strategy calls for concentrating both IBM SNA traffic and LAN traffic in 3Com smart hubs. The hub will convert the IBM data packets into IBM Logical Link Control-2 (LAN-compatible) traffic. This will allow SNA devices to communicate with non-SNA devices wired locally through the hub.

For wide-area transmission, IBM traffic would be encapsulated by a bridge/router into Transmission Control Protocol/Internet Protocol (TCP/IP) packets. Existing LAN traffic would then be routed natively.

The scheme costs about \$1,000 per port — down from \$1,400 per port when wiring IBM controllers and LAN devices directly into a bridge/router, said Jeff Thermond, 3Com director of business development.

Kaiser Permanente Foundation Health Plan in Walnut Creek, Calif., said it currently spends about 70% of its information services efforts blending its large SNA network with 100 networked Token Rings.

DeWitt Hodge, manager of communications systems, said the 3Com approach sounds at-

tractive because it converts SNA traffic to Token Rings without the expense of buying a Token Ring network adapter card for its myriad IBM cluster controllers.

In addition, "we don't want communications to our data center to be limited to 9.6K bit/sec." — the speed that IBM terminal traffic travels over wide-

area links, Hodge said.

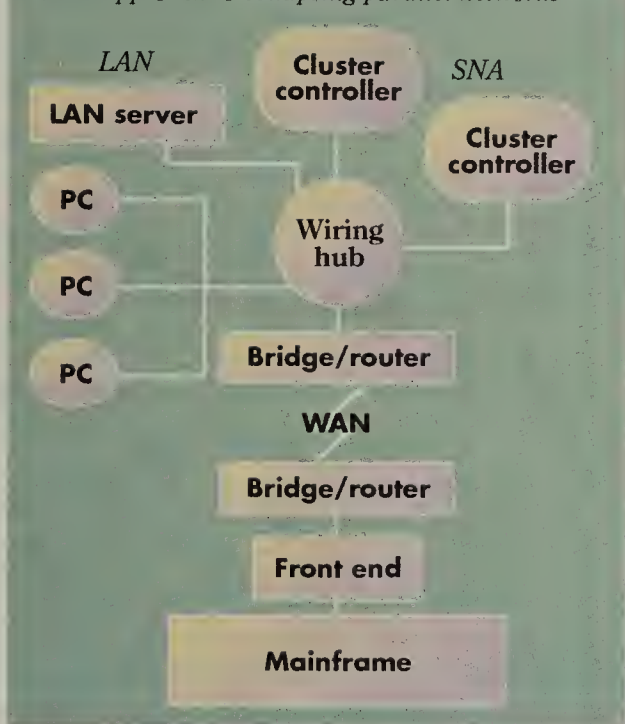
Hodge explained that having intelligent wiring hubs at each remote site and the data center beefs up the intersite communications capability to the speeds handled by the bridge/router. Today, those speeds are generally up to T1 (1.5M bit/sec.).

Hodge has not yet decided on an intelligent wiring hub scheme, but "one thing is becoming very obvious: We want to route traffic throughout our

Continued on page 69

Focal point

A wiring hub concentrating SNA and LAN traffic is one approach to collapsing parallel networks



CW Chart: Michael Siggins

some LAN protocols just don't scale up to the numbers of users you can support on an SNA network while maintaining performance levels."

IBM is expected to hit a major milestone in this area tomorrow with the announcement of product availability dates for APPN on its mainframes and front-end

Multicity conference tests meeting product

BY ELLIS BOOKER
CW STAFF

Several companies recently conducted what was billed as the first multicity electronic groupware meeting.

Bellcore in Piscataway, N.J., ran the two-hour, nine-city meeting using group-productivity software from Tucson, Ariz.-based Ventana Corp.

Ten meeting participants dialed into a Novell, Inc. local-area network using 9.6K bit/sec. modems and interacted with a prototype, distributed version of Ventana's GroupSystems V software. In addition, an audio teleconference was set up among the various sites.

Like other groupware products on the market, GroupSystems uses a computer interface to encourage idea generation, idea organization, consensus building and decision-making, as well as to create an accurate group record and action plan.

Ventana said it expects to begin marketing the enhanced version of its software in the second quarter.

ISDN-compatible

"This application lends itself perfectly to [Integrated Services Digital Network] technology and the combination of computer, audio and video services," said Steve Lang, director of corporate telecommunications at Bellcore and a participant in the electronic meeting.

Lang said video could be carried over the two 64K bit/sec. B channels in an ISDN Basic Rate Interface circuit, while some of the bandwidth of the D channel could be used for data services.

Peter Pawelko, manager of corporate telecommunications at Bellcore, noted that the "group dynamics" of interactive electronic meetings are less understood than the technology. "We don't even know yet what the ground rules are," he said.

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IN BRIEF

BICC fiber-optic unit becomes independent

■ Auburn, Mass.-based **BICC Communications'** \$4 million fiber-optic interconnect business has spun off into a new firm, **Fiber Optic Network Solutions Corp.**, in the same town. The firm is headed up by Michael J. Noonan, former BICC Communications executive vice president. The reorganization comes a month after BICC Communications' parent, BICC Data Networks Ltd., sold most of its data networking product line to **3Com Corp.**

■ The latest internetworking vendor to beef up security on its products is **Wellfleet Communications, Inc.** in Bedford, Mass. The firm last week announced a finer granularity of packet filtering on its multiprotocol routers for tighter access control and conservation of bandwidth and computing cycles.

■ The **Healthcare EDI Corp.**, a year-old consortium of health care providers, has reportedly selected **Sears Communications Co.** to provide electronic data interchange (EDI) services to its members for exchanging electronic documents such as purchase orders and invoices.

■ Meanwhile, two EDI network service providers have announced that they have gone live with the X12.56 Interconnect Mailbag Structure, a standard approved last year by an American National Standards Institute committee. **Sterling Software** and **Harbinger*EDI Services'** support of X12.56 means that documents exchanged across the two networks have a standard means of being identified and verified.

■ A second-quarter trial for exploring new customer uses of public broadband switching technology is planned by **Southwestern Bell Telephone Co.** The telephone company will use a **Fujitsu Network Switching of America** Asynchronous Transfer Mode switch to test high-speed communications services such as remote access to educational information, local-area network interconnection and medical imaging throughout the St. Louis area.

New York Telephone plans frame-relay service debut

New York Telephone Co. has announced that, as of April 24, it will become the first regional Bell operating company (RBOC) to provide a commercial frame-relay service, pending public service commission approval. The local carrier filed for a frame-relay service on Feb. 6 and hopes to introduce the service throughout the downstate New York area by April 26.

The service will offer 56K bit/sec. links, at \$67 per month, and 1.5M bit/sec. lines at \$985 per month, New York Telephone said. This is said to constitute a savings of about 25% over ordinary dedicated lines of the same speed, a company spokesman said. Other RBOCs are also preparing to introduce frame-relay services later this year.

ELISABETH HORWITT

Remedies for parallel nets

CONTINUED FROM PAGE 65

facility without going through host environments," he said. Hodge added that this is important because "we want network availability independent of the host time: This means simplified network configuration and cost savings because we're not taking up cycles on the host."

The 3Com approach addresses an issue from the Gen2 report: the tendency for degradation of guaranteed response time through routers compared with

reliable SNA response times.

Terminating IBM traffic sessions allows the hub to filter out certain session control messages that when encapsulated into TCP/IP "balloon to 50 bytes," said Nick Lippis, a principal at Strategic Networks Consulting, Inc. in Rockland, Mass. "By terminating sessions in the hub, you eliminate that traffic from going over the backbone" and give more cycles to the router for keeping performance up, he said.

Internet tapped for global virtual publishing enterprise

BY GARY H. ANTHERS
CW STAFF

"At negligible cost, in the span of a few weeks, an entirely virtual global publishing network involving nearly 150 correspondents has been assembled," Anthony M. Rutkowski, editor in chief of the *Internet Society News*, wrote in the first issue of the magazine, which was recently published.

The cover of the slick, 50-page publication asks, "Where in the world is the Internet?" The answer is nearly everywhere — in 107 countries from Afghanistan to Zimbabwe. The 150 correspondents who make up the virtual publishing enterprise are similarly dispersed. "We have people in virtually every corner of the globe. We even have an Antarctica correspondent," Rutkowski said.

The nonprofit Internet Society was formed last year to foster the evolution of the Internet, to educate users and to provide a forum for user collaboration. The quarterly news magazine offers information about Internet technology, growth of the Internet and related private networks and activities of the society and its members.

A slippery concept

Rutkowski, an Internet Society trustee and director of technology assessment at Sprint International in Reston, Va., said he started planning the magazine last August but ran into a conceptual challenge right away. "We wanted to provide a very timely snapshot of the Internet and the Internet community. But

what is the Internet? That's what's difficult. It's so heterogeneous, almost amorphous."

Rutkowski and two co-editors decided to define the Internet broadly and include representatives from many countries and interest groups. The correspondents come from telecommunications and publishing companies, academia and legal and public policy interests, he said. Topics include Internet activities by region, application and user groups, technology, Internet administration and operations, public policy and law.

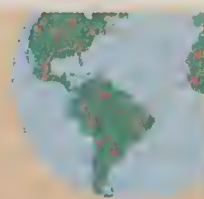
Concept development, coordination, information transfer and editing for the magazine were all done over the Internet. "Such a [publishing] network in many respects equals the complexity of those of Reuters or *Time* magazine," Rutkowski said. "The ability to do this with relative ease across the entire globe is a profound statement."

A subject-matter outline and a list of correspondents was turned into a "mail exploder," an electronic-mail list in which any person on the list can broadcast mail to the entire list by sending mail to one address. A second Internet address was established for receipt of articles by the three editors and a third was established as a repository of finished material.

The mailboxes are on a computer at the Corporation for National Research Initiatives in Reston, Va.

Long reach

The Internet extends to thousands of computers around the world



Internet Society

- 1,000 individual members
- 24 corporate members

Internet

- 770,000 computer hosts attached
- 4 million-plus users
- 7,000 operational networks; 30,000 registered networks
- 107 countries served

Source: The Internet Society CW Chart: Janell Genovese

Articles were sent in by E-mail from around the world, and when all had been edited, Rutkowski pulled up the whole mass for final formatting via Microsoft Corp.'s Word for Windows. Then it was output on a laser printer and sent to a commercial printer.

Circulation: 4 million

Rutkowski said the magazine will be published quarterly and will soon be available electronically to any of the Internet's 4 million users. He said later this year the society will also publish a journal containing more analytical articles, "archival-quality" pieces about the Internet.

Editors and correspondents of the *Internet Society News* will have their work cut out for them as they try to keep up with Internet growth.

An article in the magazine predicted there will be between 29 million and 45 million computers on local-area networks in the U.S. in 1995.

Motorola updates wireless LAN tool

BY ELLIS BOOKER
CW STAFF

ARLINGTON HEIGHTS, Ill. — Motorola, Inc.'s Wireless Enterprise Systems Group recently introduced the second generation of its wireless, in-building Ethernet local-area network product, adding 10Base-T support and a companion product that lets users link two networks inside a building or between buildings on a campus.

Altair Plus is available now, and on April 30 it will replace the existing Altair product, Motorola said. Motorola first unveiled its Wireless In-Building technology in October 1990 and introduced the first Altair products last February. The latest product is compatible with the 10Base-T unshielded twisted-

pair and Ethernet 802.3 LAN standards, as well as the Simple Network Management Protocol (SNMP).

The new Altair VistaPoint product connects wireless LANs inside or between buildings up to 500 feet apart. VistaPoint operates with 3.3M bit/sec., full-duplex throughput.

Hot buttons, small market

Although analysts said Motorola was pushing all the right buttons, particularly with the addition of 10Base-T and SNMP support, they noted the market for wireless LANs remains small.

"Today it's under \$10 million, and we think it'll grow to \$250 million in the U.S. by 1995," said Marty Palka, a senior industry analyst at Dataquest, Inc. in San Jose, Calif.

Like its predecessor, an Altair Plus network involves a centrally located Control Module, which attaches to a server or a wire network, and multiple User Modules, which communicate over a low-power 18-GHz radio link to the control modules. In the new Altair Plus product, each Control Module can connect up to 32 Ethernet devices; each User Module can connect as many as eight Ethernet terminals, PCs or printers.

Pricing for a Control Module remains at \$3,995. User Modules with 10Base2.5 Ethernet are \$1,195 each, while User Modules with the 10Base-T option have a retail price of \$1,095 and will be available in May.

VistaPoint orders are being taken now for the \$11,500 package for a June availability.

Biscom gear snips fax snags

BY NELL MARGOLIS
CW STAFF

Corporate departments that feel their hearts being slowed by excess fax buildup may welcome Biscom, Inc.'s blueprint for a bypass: the FAXCOM Enterprise architecture, a fax server-centered method of internetworking a firm's disparate computing platforms — mainframes, minicomputers and local-area networks — together with a multichannel fax server and routing all fax-mail directly to its intended recipients, wherever they are located.

Built around Biscom's FAXCOM 4000 server, which was introduced in February 1991 and began shipping the following August, the strategy is fundamentally an effort on the part of the Billerica, Mass.-based computer vendor to "put words around hardware they've already got," said Kenneth Camarro, president of Fairfield, Conn.-based market research firm Camarro Research. However, he added, the Biscom blueprint's atypical inclusion of minicomputers and mainframes adds "a subtle but extremely important" wrinkle to other internetworking plans.

"The users on these platforms are not just doing word processing — we're talking serious transaction processing," Camarro noted. And while Biscom's technology is unlikely to be unique, he said, "It's many laps ahead of the next comers."

At Wall Street investment house Prudential Securities, Inc., a FAXCOM 4000 is about to begin supporting three applications: a back-room customer confirmation operation, an internal requisition routing system and an analytical package for use in the fixed-income trading department. In the latter, said Financial Strategies Group senior associate Andrew Wax, the FAXCOM 4000 will work with home-grown software currently running on a Digital Equipment Corp. VAXcluster to let the department analyze financial models, produce a host of ever-varying reports and fax each to its appropriate target.

Prudential, Wax said, found other products that might be able to deliver the fax mail — but not across the variety of platforms that the Biscom box serves.

Inner workings

The key to FAXCOM Enterprise, according to Biscom, is the FAXCOM 4000's embedded inbound routing technology: a combination of direct inward dial and dial-tone modulating frequencies that allow the server to talk to multiple hosts at disparate platform levels, simultaneously. Particularly striking, Camarro said, is the Biscom system's ability to interoperate with a variety of leading LAN products, including Banyan Systems, Inc.'s enterprise-oriented vines.

While FAXCOM Enterprise is too recent for meaningful road-test results, the company's credentials could spell at least comparative comfort, Camarro noted.

Founded in 1987 by former Wang Laboratories, Inc. executive H. K. Ho, the firm currently boasts some 2,000 installed systems — about 33% on LANs, and another approximate 33% on IBM Application System/400 midrange systems.

NEW PRODUCTS

Customer-premises equipment

Pacific Communication Sciences, Inc. has expanded its Clarity Series line of voice/fax/data communications products.

The new CS9000 Distributed Private Exchange is a digital switch that allows users to operate fully meshed, thin-route (19.2K bit/sec. links to T1 and E1 lines) wide-area networks based on fractional T1 and other substrate digital services. Up to 20 of the company's CS8000 multiplexers can be connected to each CS9000.

The resulting network supports di-

rect-dial access between any two points.

Pricing starts at \$25,000.

Pacific Communication Sciences
10075 Barnes Canyon Road
San Diego, Calif. 92121
(619) 535-9500

A multiprotocol frame-relay access device has been announced by Dowty Communications, Inc.

The FPX2195 FRAD routes synchronous and asynchronous communications over frame-relay services. Stand-alone configurations are available, or a card insert is offered for the firm's FPX2195 products.

Pricing starts at \$5,995.

Dowty Communications
Cherry Hill Industrial Center
55 Carnegie Plaza
Cherry Hill, N.J. 08003
(609) 424-4451

UDS Motorola has announced an Integrated Services Digital Network (ISDN) terminal adapter with up to four Basic Rate Interfaces.

The TA220 connects up to four terminals, personal computers or other devices to an ISDN network.

A two-port model with full numeric keypad costs \$1,395.

UDS Motorola
5000 Bradford Drive
Huntsville, Ala. 35805
(205) 430-8000



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Front ends, multiplexers

Digital Link Corp. has introduced a low-end T3 Digital Service Multiplexer.

The DL3100's modular design allows it to serve as a multiplexer, T3 Data Service Interface or T3 Channel Service Unit (CSU). It supports interfaces including High Speed Serial Interface V.35, DS3 and Switched Multimegabit Data Service. As a Data Service Interface, it connects one high-speed High Level Data Link Control-based device to a fast-packet service. As a CSU, it connects one T3 transmission link to any T3 network and provides diagnostic and management tools for all T3 traffic.

Pricing for a multiplexer configuration

starts at \$11,495, the company said.
Digital Link
252 Humboldt Court
Sunnyvale, Calif. 94089
(408) 745-6200

Micro-to-host

Pericom, Inc. has developed Teemtalk-340W, a Digital Equipment Corp. VT340 terminal emulator that runs under Microsoft Corp.'s Windows environment.

The product offers a broad range of alphanumeric and graphical terminal emulations and file transfer protocols including Kermit, XModem and YModem. Text display features include double width, underline, bold, inverse and flashing characters. Teemtalk-340W supports Dynamic

Data Exchange and operates in standard and enhanced Windows modes.

Pricing is \$449 for a single copy. Until May 1, 1992, an initial license can be purchased for \$199.

Pericom
Suite D
9 Princess Road
Lawrenceville, N.J. 08648
(609) 895-0404

Renex Corp. has announced the availability of TMS-Four, a communications controller for IBM mainframe and midrange terminal emulation.

TMS-Four allows multiple simultaneous host sessions for up to 128 logical units on up to eight controllers. Emulations provided include 3270, 5250 and

3767. The software included with the product can be distributed to an unlimited number of on-site personal computers.

Pricing starts at \$7,795.

Renex
1513 Davis Ford Road
Woodbridge, Va. 22192
(703) 494-2200

Brixton Systems, Inc. has started shipping BrxQLLC (Qualified Logical Link Control), which allows Sun Microsystems, Inc. workstation users to access mainframes over X.25 networks.

Running in conjunction with Brixton Systems' Brx3270, Brx3770 and BrxLU0 emulators, the product lets Sun users communicate with IBM and compatible mainframes over public and private lines. BrxQLLC is bundled with the company's BrxX.25 and BrxPU2 Server products. The price is \$3,250.

Brixton Systems
Suite 4200
185 Alewife Pkwy.
Cambridge, Mass. 02138
(617) 497-2938

Systems Network Architecture

Cleo Communications has announced software connecting Unix systems with other computers in Systems Network Architecture networks.

The software provides Advanced Program-to-Program Communications (APPC) connection via IBM's LU6.2 protocol. It can be used alone or in conjunction with the company's 3270 and 3770 emulation software.

The APPC Developer's Kit costs \$2,000, including eight hours of consulting and technical support. Additional runtime licenses cost \$400 per workstation.

Cleo Communications
3796 Plaza Drive
Ann Arbor, Mich. 48108
(313) 662-2002

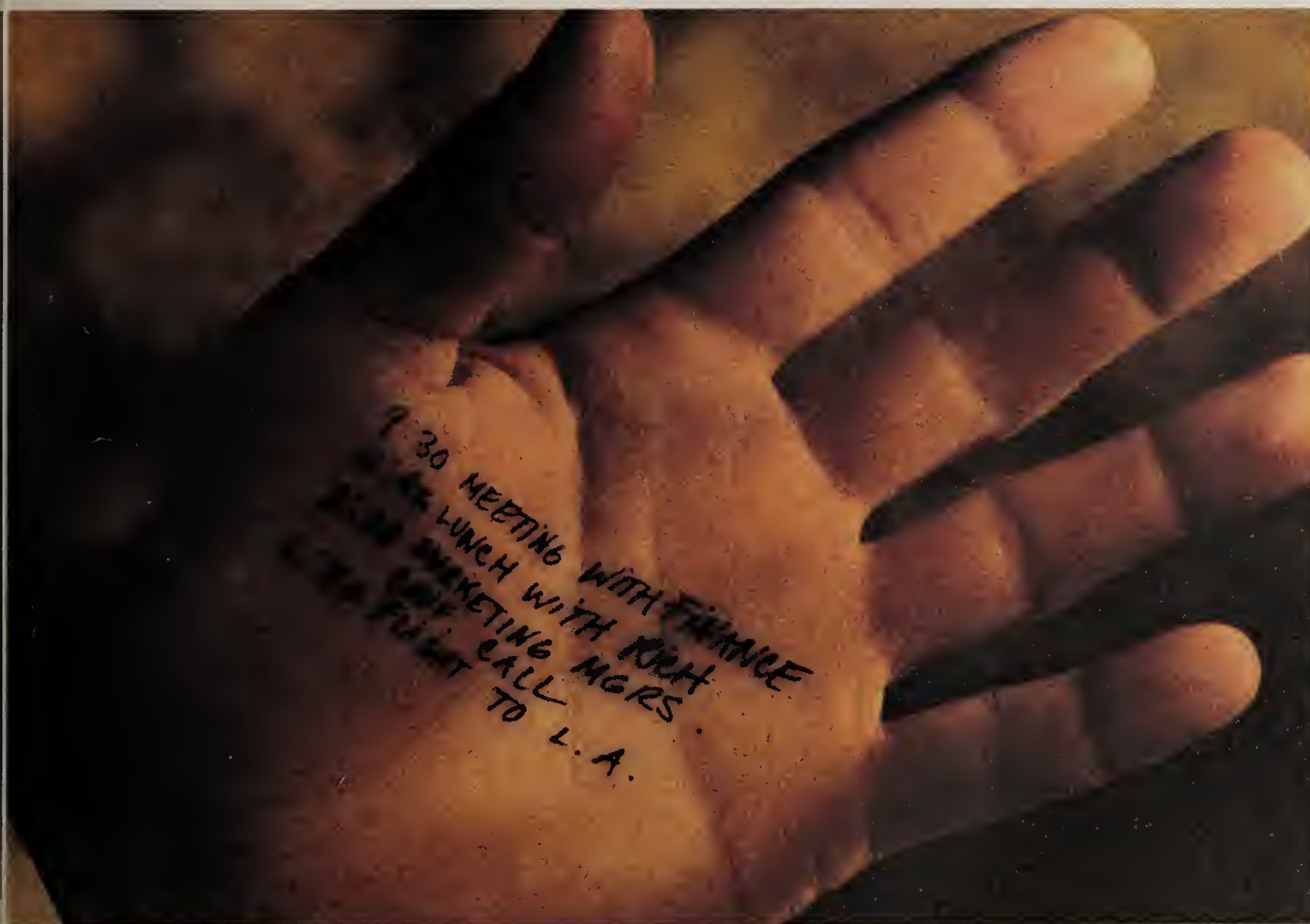
Network management

Network Monitoring, Inc. has introduced SnapProbe Basic, a network management tool that runs under Microsoft Corp.'s Windows.

SnapProbe Basic supports the Simple Network Management Protocol. It collects Management Information Base (MIB) I and II data and stores it in a database for statistical and graphical analysis. The product costs \$495.

The company also announced add-on tools for planning and managing network configurations and for adding RMON MIB support.

Network Monitoring
Suite 170
2041 Mission College Blvd.
Santa Clara, Calif. 95054
(408) 986-1166



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Check out the
Marketplace Pages
on Page 120.



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Future Wang imaging success hinges on key Unix elements

ANALYSIS

BY ELLIS BOOKER
CW STAFF

LOWELL, Mass. — To make Wang Laboratories, Inc. executives bristle, try suggesting their company has become an also-ran in the imaging marketplace.

One of the first among computer vendors to make imaging a pillar of its overall business strategy, Wang is understandably territorial about the technology.

Wang's appreciation of the technology — and the needs of the people who use it — was demonstrated by a *Computer-world* Buyers' Scorecard [CW, Dec. 16, 1991], in which Wang won top marks in customer satisfaction among Wang, FileNet Corp. and IBM image users.

Yet its financial woes and reorganizations have taken a toll on this part of Wang's business, according to analysts.

"Eighteen months ago, when

their financial problems came out, their image sales disappeared," said Scott McCready, director of image management technology at IDC/Avante Technology, a market research firm based in Framingham, Mass.

McCready estimates, however, that during the past six or seven months, Wang has regained momentum by zoning in on workgroup solutions rather than enterprisewide ones.

New solutions

Another explanation for what some see as an uptick in Wang's imaging business has been the opening of the Wang Integrated Image System (WIIS) to include solutions other than the proprietary Wang VS, the traditional hardware core of WIIS.

Last year, for example, the company introduced a personal computer client, running under Microsoft Corp. Windows, for the VS.

In addition, it introduced a

product for Novell local-area networks that uses Novell's own NetWare 386 server. Meanwhile, Wang for some time has aggressively provided connectivity between the VS and a variety of non-Wang hosts.

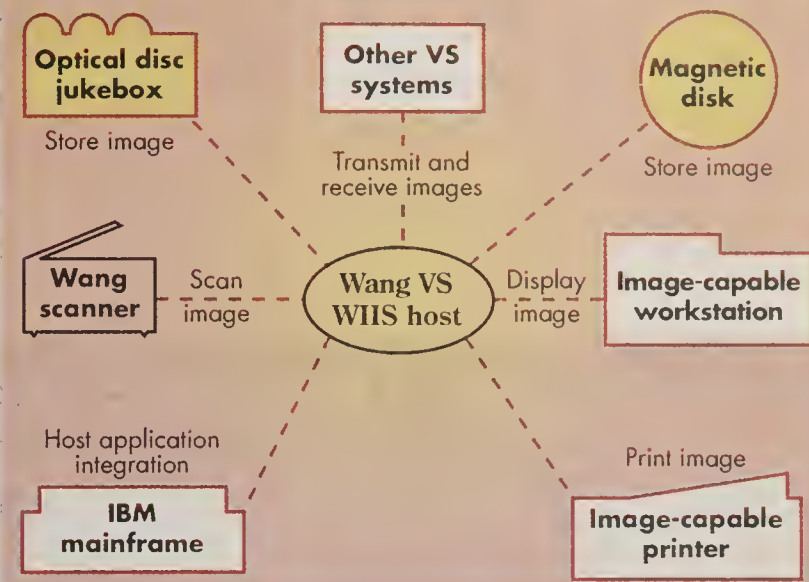
However, the most significant expansion of WIIS could come later this year, when Wang promises a Unix server in the form of the RISC System/6000. Nine months ago, Wang became a reseller for IBM's reduced instruction computing line and the IBM Application System/400.

Industry analysts said they look forward to the RS/6000 entry, but several noted that Wang still must work to sell this system, whether by forging new accounts, migrating its installed base of VS customers to Unix or a combination of the two approaches.

"They know the VS will hold them back long term," said Pamela Bliss, a senior analyst in the document imaging group at Da-

At the core

The Wang WIIS strategy has a Wang VS at the center, at least until Unix servers are integrated



Source: Wang Laboratories, Inc.

CW Chart: Michael Siggins

taquest, Inc. in San Jose, Calif.

A problem for Wang is that this installed VS base — Bliss said she estimated that Wang has installed approximately 350 commercial imaging systems (the majority VS) worldwide to date — does seem quite satisfied with WIIS and is disinclined to migrate to Unix, even if it has a Wang nameplate on it.

Happy without changes

"We're not even contemplating changing hardware," said Walter Corbitt, chief of information systems at the Alabama Department of Environmental Management in Montgomery, Ala. Corbitt's department, a Wang shop since 1988, has a half-dozen VS-based imaging applications representing some 150,000 scanned images.

Still, Corbitt is pleased by the IBM/Wang alliance: "It's encouraging to me ... [and] it means IBM recognizes the success and significance" of Wang's software.

In addition to imaging, there

will be work flow, database, applications development and document management tools for the RS/6000 shipping by year's end, according to David I. Goulden, vice president of Wang's Office 2000 Systems Marketing and Imaging Systems Group.

But the issue is further complicated because delivery of the RS/6000 image platform is late, according to Bruce Silver, director of document and image management strategies at BIS Strategic Decisions in Norwell, Mass. "When they outlined for us their imaging strategy last fall it sounded great — very positive," he said. "We'd hoped to have seen the RS/6000 rollout by now."

However, Silver praises the Open/Image approach. "It'll have a common set of core routines to image-enable MVS, AS/400, RS/6000 and VAX," he said. "That's something no one else does."

Wang's WIIS costs between \$75,000 and \$1.5 million, depending on system size.

Data center automation spells savings

ON SITE



Shonna Valeska

From left: John Acca and Peter Coriasco

Bankers Trust Co., New York

- **Challenges:** Restructure data center; reduce costs.
- **Strategies:** Consolidate applications onto less hardware and eliminate aging computers and peripherals. Use advanced technology to streamline requirements for machines and personnel. Increase operator productivity via automation — i.e., command center.

BY SALLY CUSACK
CW STAFF

NEW YORK — Restructuring a mission-critical corporate data center need not always involve a long planning process and pricey consultants. Sometimes, the simpler and more obvious solutions do the trick.

Just ask the principals involved in the data center makeover at Bankers Trust Co. — the seventh largest bank in the U.S. — where a staff-developed reorganization plan came together in six months. It is a plan that can bring big savings by drawing on existing technologies and by adding a tweak here and a tuck there.

John P. Acca, vice president and operations manager for Bankers Trust's Digital Equipment Corp. data centers, introduced a 16-point restructuring plan last year that should reduce costs by 10% to 15% while increasing reliability. All 16 separate projects are now being implemented, working toward the 1993 completion goal.

"These are not the days where you would go around hiring 20 people to do something faster — you prioritize and try to figure out how best to get the job

Continued on page 77

A growing market

The imaging market — encompassing support, maintenance, services, software and hardware — will balloon from \$1.8 billion this year to \$11.1 billion by 1996, according to figures published by BIS Strategic Decisions in Norwell, Mass.

To date, the majority of image systems deployed by all vendors have involved highly structured "production" applications such as insurance claims processing.

However, existing applications are now being "image-enabled," so that imaging can move horizontally across departments and offices to become a core part of standard office computing.

For Wang, which recognized earlier than most companies that imaging was destined to become an integral part of most business processes, this phenomenon could play into its office automation heritage.

ELLIS BOOKER

FileNet unveils general-purpose imaging system

BY ELLIS BOOKER
CW STAFF

COSTA MESA, Calif. — Seeking to broaden the appeal of its document imaging system, FileNet Corp. recently introduced FolderView, an icon-driven image-management system aimed at office professionals.

Up until now, the majority of FileNet's installations have involved highly structured, repetitive applications such as insurance claims processing.

FolderView, by contrast, is targeted at users who need to navigate through images, text and data in a less structured

fashion.

Speeding the examination, sorting and compiling of image documents is the key to FolderView, according to Jordan Libit, FileNet's vice president of marketing. Libit said 90% of the paper that professionals handle today is irrelevant to their decision-making, but "gathering the critical 10% is what consumes much of their time and talent."

Patterned on success

FolderView, which runs under Microsoft Corp.'s Windows and requires FileNet's own WorkForce Desktop environment for personal computers, is an extension of

FileNet's WorkFlo Business System — its core image management system.

FolderView also clearly seeks to leverage FileNet's often-praised WorkFlo software, which automatically routes document images between individuals and applications into the heart of the office.

FileNet is positioning FolderView as an "outer ring" to existing production-oriented FileNet imaging applications, Libit said.

For example, a savings and loan department that scans and processes hundreds of thousands of mortgage documents might install FolderView to give other bank departments the ability to ma-

Window view

FolderView's features include:

- Icons that designate different document types.
- Options for displaying various-sized documents and folders.
- The ability to highlight and mark documents for quick reference.
- A function to attach notes to document margins.
- A document sort capability.



CW Chart: Janell Genovesi

nipulate "folders" of images.

"This is a tool for their installed base," agreed Pamela Bliss, a senior analyst in the document imaging group at Dataquest, Inc. in San Jose, Calif. "Even though it runs under Windows and industry-standard PCs, they're not going to try and sell this for PCs alone."

Pacific Mutual Life Insurance Co. in Newport Beach, Calif., a FileNet customer since 1987, is keen on using FolderView to expand the use of imaging to its underwriters.

"Right now, we have FileNet installed for 150 of the customer representatives on a FileNet application," said Alan Wuest, manager of policy benefits services. "The ability [in FolderView] to put related images in folders is important for the underwriters, who want to refer to specific groups of documents," he said.

FileNet, which posted 1991 revenue of \$122.5 million, claims an installed base of 500 systems.

Scheduled to be available in July as a component of WorkForce Desktop Release 3.0, FolderView is priced at \$795 per workstation.

For applications demanding an overall work flow automation system, FolderView requires FileNet's WorkFlo Script Runtime (\$925) and AutoForm Runtime (\$495).

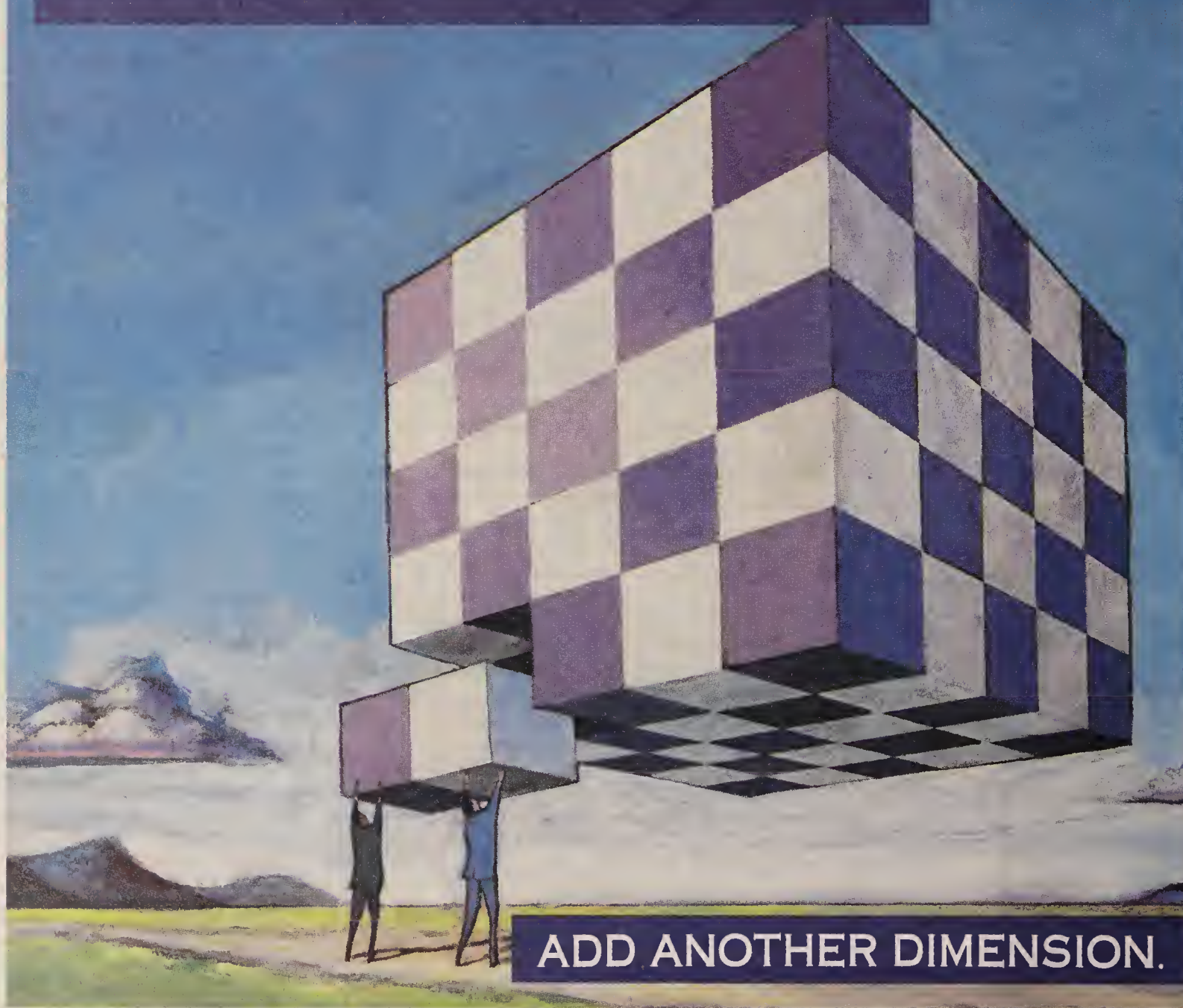
IN BRIEF

Wang users elect president

■ The U.S. Society of Wang Users (USSWU) elected William Sturgeon as president, replacing the group's first president, Matthew Gillman. Sturgeon left his spot as president of the San Diego user group, which he helped start in 1982. Gillman remains president of the International Society of Wang Users and on the USSWU board for the North Central region.

■ Systems Center, Inc. in Reston, Va., announced VMCenter II/E — an updated version of its family of products for VM data center management — for IBM's Enterprise System Architecture (ESA) 1.1 operating system. The firm said the system utilities for tasks such as disk management, security, performance monitoring and other functions will be available next month for ESA 1.1 and will eventually be "re-architected" for large IBM Enterprise System/9000 systems.

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Automation spells savings

CONTINUED FROM PAGE 75

done," says Peter Coriasco, a vice president working with Acca at Bankers Trust.

The bank has two DEC data centers to control the global money transfer, trade products and cash management portion of the business: one in New York and a backup center in Harborside, N.J.

Bankers Trust has been quite happy with DEC equipment and services during the past two decades, but like many other large information technology users, it began in the late 1980s to evaluate new operational methods to achieve greater savings and increase service.

New Year's resolutions

In 1991, Acca and his staff outlined several goals and methods for meeting this challenge, beginning with an out-with-the-old and in-with-the-new approach. Topping the list was the tossing out of several old DEC PDP machines used primarily for application development and migrating the PDP programs to DEC VAX platforms.

The centerpiece of the new plan, however, is the bank's new automated command center, which is about half completed. "This will let us go to lights-out operations by first-quarter 1993," Acca said. Plans call for one command center to run multiple data centers, including the one in Harborside and one in Frankfurt, Germany.

Coriasco pointed out that the VAX 6000-class systems will allow more consolidation of software applications. This will result in fewer but larger systems.

However, the bank is waiting for particular tools from DEC, such as class scheduling and partitioning, before it can continue with the consolidation effort. Coriasco said the vendor has promised to look into it, but at this point no concrete answer has been provided.

The bank currently has more than 50 DEC VAX systems and hundreds of disk drives.

All-around savings

Running DEC's VAXCluster Console System, the monitored, icon-driven command center has also eliminated the need for hard-copy logs and other printouts. All of this is now automatically written to disk, saving more time, space and ultimately, money. Printing previously done at the data center will now be handled on a departmental basis. Tape library functions will also be automated via the command center, and robotic tape handlers are being tested.

The bank is currently working with an undisclosed third party to provide remote switching capabilities from the command center. Bankers Trust now uses a proprietary switch for logically swapping failed VAX systems out of the production cluster and replacing them with development systems.

Acca and his team are also consolidating older 14-in. disk storage onto less space-consuming 5¼-in. RA series technology and plan to start using tape robotics. This means the data center will realize an immediate 50% reduction in floor space needs, which is worth quite a bit in New York, where rents run about \$31 per sq ft, Acca pointed out.

NCR cashes in on profitable ATM business

BY ELLIS BOOKER
CW STAFF

DAYTON, Ohio — Although its computer strategy has garnered the most headlines, NCR Corp.'s automated teller machine (ATM) business pulled in about \$800 million of the company's \$6.3 billion in revenue last year and had a 30% share of all new ATMs shipped worldwide, according to The Nilson Report, a market research firm in Santa Monica, Calif.

Last month, NCR announced a number of ATM contracts, including one for a novel system that will allow New Jersey motorists to renew their licenses and han-

dle other chores while shopping at a mall.

Dubbed TAG: The Motor Vehicle Self-Service Helper, the system will be demonstrated off-line at locations around the state beginning this spring.

Drivers will get a demonstration of a registration renewal at the self-service station, which will feature colorful graphics to guide the user. Registration renewal was chosen because it represents about 50% of the walk-in business at the New Jersey Department of Motor Vehicle Services.

California currently uses a similar self-service platform in its motor vehicle agency locations. But New Jersey officials said

their system — which will go live by the end of the summer — will be even more convenient because the ATMs will be placed in shopping malls and other public places.

In other news, NCR last month announced a multimillion dollar ATM order from National Westminster Bank, which operates the largest bank branch network in the UK, with 2,800 locations.

Also last month, NCR announced a \$1.5 million reseller agreement with Altech, Inc. that will provide financial teller automation solutions to banks using NCR's System 3000 microprocessor-based hardware platform.

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THIS IS WHAT A MASSACRE LOOKS LIKE IN THE WORLD OF APPLICATION DEVELOPMENT.

DATAPRO DBMS USER SURVEY

	PROGRESS SOFTWARE	SYBASE	INFORMIX	INGRES	FOCUS	ORACLE
ATTRIBUTES						
Reliability	9.3	8.7	8.9	8.1	7.7	8.8
Ease of Use	9.1	8.2	8.2	7.9	7.9	7.4
Ease of Install/Upgrade	8.9	8.0	8.8	7.1	8.1	7.6
Price/Perform Return	9.1	8.3	8.5	7.5	8.1	7.1
FUNCTIONALITY						
Flexibility	9.1	8.8	8.6	9.0	8.4	8.6
Interface Capabilities	8.9	8.9	8.4	8.7	8.7	8.0
Comprehensiveness	9.1	8.8	8.8	8.3	8.7	8.7
User Friendliness	8.9	7.7	8.3	7.9	7.5	7.3
OS Compatibility	9.6	8.4	8.9	9.1	8.8	9.0
PRODUCT SUPPORT						
Documentation	9.0	8.2	8.6	5.7	6.2	7.3
Vendor Training	8.7	7.9	8.0	7.2	7.6	8.0
Problem Response Time	8.8	7.5	7.2	6.1	6.4	6.7
Quality of Vendor Support	9.0	7.8	7.5	6.4	6.9	7.0
Frequency of Releases	8.5	7.5	6.7	7.2	7.7	7.2
Response to User Request	8.8	7.5	7.8	7.0	7.0	7.3
Overall Satisfaction	9.3	8.7	8.5	8.3	8.0	7.9

Compiled from the 1991 Datapro Reports on Software/Computer System Series Software, available for each product listed (Sybase from 1992). The results are those of actual users of the products as surveyed by Datapro.

VARBUSINESS DBMS REPORT CARD

	PROGRESS SOFTWARE	INFORMIX	ORACLE	ASHTON- TATE	INGRES
PRODUCT FEATURES					
Ease of use	9.02	7.07	6.00	6.19	5.90
Memory requirement	7.37	6.16	4.25	6.19	5.22
Ease of programming	9.03	7.09	6.06	6.20	5.90
Ability to manipulate data	9.19	7.41	7.44	6.81	5.67
Sorting capabilities	9.02	7.44	7.69	6.65	5.78
Provision for software security	8.56	6.93	7.28	5.07	5.78
Report writing capabilities	8.39	6.72	6.59	5.71	4.11
Ease of use of Interface	8.51	7.05	6.15	6.10	6.10
Software integration capabilities	8.34	7.26	7.24	6.27	6.10
Ease of data retrieval	9.08	7.68	7.66	6.61	6.11
Satisfaction with product profitability	8.26	7.04	6.22	5.58	5.13
Overall quality of product	8.94	7.37	6.69	6.32	5.44
Product Features Average	8.64	7.10	6.61	6.14	5.60
SUPPORT FEATURES					
Provision for customer support	7.74	5.98	5.76	5.77	5.50
Charges for training time	6.88	4.49	4.59	5.64	4.56
Provision for technical support	7.81	5.76	5.72	5.87	5.22
Provision for marketing support	6.89	5.88	6.09	6.13	3.80
Documentation & product information	8.74	6.73	6.56	6.45	5.56
Frequency of updates & revisions	8.35	5.88	6.34	5.57	5.00
Support Features Average	7.73	5.79	5.84	5.90	4.94
Overall Average	8.34	6.66	6.35	6.06	5.38

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Rated on everything from performance and reliability to service and support, PROGRESS trounces all of its competitors in the 1991 Datapro user surveys and the 1991 VARBUSINESS Software Report Card.

Topping the Datapro surveys for the fourth year in a row, users give PROGRESS a rating of 9.3 for overall satisfaction. The highest mark ever awarded.

Against all comers, PROGRESS is unsurpassed in all 15 categories (okay, we tie once). With a 9.0 or higher in eight categories.

PROGRESS SOFTWARE

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APPLICATION DEVELOPMENT

CASE • LANGUAGES • TOOLS

IN BRIEF

Progress, JDE unite

■ **J. D. Edwards & Co.** in Denver and **Progress Software Corp.**, based in Bedford, Mass., have entered a joint agreement whereby J. D. Edwards will use the Progress Application Development System to develop client applications that interface with the JDE Application System/400-based server programs in a cooperative processing environment. J. D. Edwards expects to announce product availability by year's end.

■ **Progress** also announced the availability of Progress/400, an application development program that allows AS/400 developers and end users to create and run distributed client/server applications in the AS/400 mode using the IBM LU6.2 communications protocol. Progress/400 will allow end users to transparently access data across networks that include Microsoft Corp.'s Windows, OS/2 and IBM RISC System/6000-AIX clients linked to IBM AS/400 database servers. Pricing for the Progress/400 ranges from \$3,400 to \$91,900, according to the company.

■ **San Mateo, Calif.-based Viewpoint Systems, Inc.** will release Accesspoint, a Windows-based, icon-driven query tool, at the end of this month. According to Viewpoint, Accesspoint will allow users — regardless of technical background — to retrieve and manipulate data from disparate SQL servers and SQL host databases.

■ **Silicon Graphics, Inc.** in Mountain View, Calif., will market version control and configuration management products from **Atria Software, Inc.** as part of its Case-vision product line. The companies will target Silicon Graphics' existing technical users.

System changeover defies city limits

BY KIM S. NASH
CW STAFF

Borscht and the Pick operating system. What do these two things have in common? Linda Ristow — for another week.

The data processing manager for the city of Irvine, Calif., is halfway through a two-week stint in St. Petersburg, teaching the city's information systems workers about a project she recently completed: converting a portfolio of 65 Pick-based municipal applications to run on Unix machines, all the while keeping the city running smoothly.

Gouged budgets and the hiring freezes ripping through governmental bodies right now can be a nightmare for an IS department that needs a revamp. But Irvine found a way around those roadblocks by ditching old proprietary machines for faster, more efficient Unix-based computers while keeping the "robust" Pick application development environment, Ristow said.

A smooth transition

She recently led her staff of 12 through a Pick-to-Digital Equipment Corp. Ultrix conversion of Irvine's applications. The process went so well that other local governments took notice.

No small benefit of that change was the resulting two-thirds cut in maintenance costs once Irvine got settled on the DECstation. "And we did it with about 30% less staff," Ristow

said. Her department has had some turnover in recent months, and officials froze the vacated positions, she explained.

When the city of St. Petersburg asked Ristow to help construct a similar operation on the other side of the world, she gladly said "Da!"

"We've also had calls from

Ultimate minicomputers were bogging down. The load became unbearable several months ago when it took more than 11 hours to produce a routine map predicting the impact of certain building proposals, she said.

However, Ristow said she saw no reason to give up the dozens of carefully tailored applica-

Ristow and her staff, the majority of whom helped build the original systems. She opted to do the changeover primarily in-house to broaden her staff's skills and get the new systems just right.

"It's like putting on a new pair of shoes. You stretch them here and there, but when you're done, they're really yours," she said.

Besides learning to configure Pick applications to run on Unix-based hardware, other government IS departments want to learn how to offer the kind of innovative services Irvine provides, Ristow said.

City hall is experimenting with public access terminals, where citizens can enter queries about current municipal projects or school zones, for example. As long as people know certain key bits of information, such as parcel number or address, Irvine's massive central database can provide an answer.

"The terrific response time of the DEC [machines] allows us to do that," Ristow said.

ON SITE



Linda Ristow
City of Irvine
Calif.

• **Challenge:** Current hardware failing; facing budget and staff cuts.

• **Technology:** Pick applications originally running on Honeywell Ultimates were converted to run under DEC Ultrix.

• **Results:** Saved two-thirds of the costs previously spent on maintenance; new revenue-generating applications made possible.

Australia and Greece as well as other U.S. cities," Ristow said. "They want to know how we run."

That is not a simple question. About 110,000 people live in Irvine's 42 square miles, and four times as many people work there. Like other local governments, Irvine tracks population swings and business and land development. However, some tasks are less common, such as monitoring air quality and projecting traffic patterns where three California highways meet.

Ristow found that as Irvine's demands on the system grew, the city's two Honeywell, Inc.

tions her staff spent 8 to 10 years building. "We weren't ready to shift just because hardware was failing on us," she said.

Worth the effort

The robustness of the Pick application development environment also compelled her to stick with it. "We liked the reliability and price/performance of Unix hardware, but there aren't many good tools available for Unix," Ristow said.

She bought conversion tools and enlisted the part-time help of Laguna Software, a small developer in Laguna, Calif. But most of the conversion was done by

Focus tool family gains OS/2 member

BY CHRISTOPHER LINDQUIST
CW STAFF

NEW YORK — Information Builders, Inc. has expanded its family of Focus development tools by adding a Presentation Manager-based implementation for the as-yet-unreleased OS/2 Version 2.0.

PM/Focus is the first product in the Focus family to make use of a graphical user interface, including check boxes, buttons, graphical objects and fonts. It includes a File Painter, Forms Painter and Query Painter that allow users to create graphical applications for accessing data across desktop, minicomputer and mainframe systems.

"We're looking at it as an

easy way to develop front ends" to systems, said Kelly Hemphill, a systems analyst and project manager at pharmaceutical firm Burroughs Wellcome Co. in Research Triangle Park, N.C. Hemphill has been working with Focus products for nearly a decade and said the new version "is terrific in terms of prototyping."

PM/Focus supports client/server applications through Information Builders' Enterprise Data Access/SQL product line, which supports more than 50 databases and 35 hardware platforms, including IBM mainframes and Application System/400s and Digital Equipment Corp. VAXs.

PM/Focus tools are accessed through the Application Editor,

which allows users to view, create, edit, search or sort objects such as forms and reports.

The File Painter lets users manipulate databases, segments and fields to form database structures. Users have access to features such as encryption, access rights and cross-referencing via menus and dialog boxes.

The Forms Painter is used to create the application interface using desktop publishing-like tools. Form and button objects allow developers to quickly develop a front end and connect it to the underlying application.

The Query Painter allows users to create and view report requests and the reports they generate. It also includes a Hotscreen feature for viewing, highlighting, searching and moving data to other applications, such as Microsoft Corp.'s Excel or Lotus Development Corp.'s 1-2-3/G.

PM/Focus will be available near the end of April for a price of \$798.

Intersolv tools debut

ROCKVILLE, Md. — Two recently released tools from Intersolv, Inc. target personal computer and minicomputer environments.

Graphical Application (GA) Workbench is an OS/2-based tool for putting graphical front ends on existing or new applications running in either OS/2 or Microsoft Corp.'s Windows environments.

GA Workbench is priced at \$895 per developer through April, after which the price goes up to \$1,195. Volume prices are available.

Intersolv also brought out APS OS/400 Generator Target for Cobol, which was designed to let developers working on PCs or local-area networks create production applications for the Application System/400.

APS OS/400 Generator is another module in Intersolv's line of products supporting IBM's Systems Application Architecture strategy, according to Mike Gilpin, director of product management.

Per-developer pricing for the product starts at \$750, with volume pricing available.

KIM S. NASH

Must struggles to reinvent itself

Some analysts question company's ability to grow, despite solid user base

BY JOHANNA AMBROSIO
CW STAFF

Must Software International is not exactly a household term outside the loyal customer circle of its Nomad fourth-generation language (4GL). And although company executives said they would rather be good at what they do than achieve celebrity status, some observers have questioned whether that philosophy will be enough to see Must thrive during the next decade.

"They certainly have a respectable customer base," said Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass. Must executives said Nomad is used at approximately 900 sites worldwide. Nevertheless, Acly said, "I can't see them making any gains in market share."

In fact, Wilton, Conn.-based Must maintained its 2.1% market share in the U.S. 4GL arena during 1989 and 1990, according to research firm International

Data Corp. The figures for 1991 are not yet available. In contrast, Information Builders, Inc. in New York slipped a bit, from 11.9% in 1989 to 11% in 1990.

Standing still

Still, observers said, Information Builders, through its pivotal role in IBM's Information Warehouse architecture and certain other moves, has market momentum behind it as well as more than 4,500 sites using Focus. In comparison, Must is "just treading water," Acly said.

Another analyst was more blunt: "The mainframe-based query market is going away, and the survivors will be the ones like [Information Builders] that recognize this and retarget their products to the area of information access. It's not a rosy picture for Must."

The analyst, who asked not to be named, also questioned the commitment of Must's corporate parent, Paris-based Thomson SA, which acquired Nomad from Dun & Bradstreet Computing Services in 1987.

Must President Jean-Luc Badault responded, "It's true that we are perceived as a mainframe 4GL vendor, but we are not. We are a client/server vendor."

He said revenue has grown by 17% yearly since 1987 because of this strategy.

Last year alone, he said, some 40% of U.S. revenue came from new customers, and almost all of those customers bought the client/server version of Nomad

in addition to any mainframe product.

Badault added that the company is now positioning its product primarily as an applications development tool to rival computer-aided software engineering.

Must's vice president of marketing, Abby Pinard, said that while it is important to run on the platforms most in demand by customers, "we're never going to be on everything. We're more interested in building Cadillacs as opposed to having Nomad on every box."

Company backers also pointed out that the firm has for some time emphasized the product's information access features by making it work against IBM's DB2 and SQL/DS, as well as with Teradata Corp.'s DBC/1012 database machine.

Pinard said the company also recently revamped its list of development priorities to better concentrate on the three areas Must considers most strategic. Key among these is a graphical user interface that requires a "significant rearchitecting" of the product to include object-oriented features. She would not commit to a delivery date for that, however.

Project projection

The second most important project is a rearchitecting of the cooperative processing version of Nomad, available since 1988. Scheduled to be available by year's end, this version will feature higher performance and direct access from the personal computer to DB2.

Third on the priority list, Pinard said, is a Unix version of Nomad, slated to be available by April 1993. At the same time, Must will continue to enhance its mainframe, Digital Equipment Corp. VAX, DOS and OS/2 Nomad packages, with a version for Fujitsu Ltd. mainframes due out by early summer.

For their part, Nomad users said they are satisfied with both

"I T'S TRUE THAT we are perceived as a mainframe 4GL vendor, but we are not. We are a client/server vendor."

JEAN-LUC BADAULT
MUST

Software AG ships 4GL

BY KIM S. NASH
CW STAFF

RESTON, Va. — Software AG of North America, Inc. recently introduced a new version of Natural, a fourth-generation language.

Unlike its predecessor, Natural 2.2 is fully compliant with IBM's Common User Access standards for user interfaces, according to Joseph Agro, an executive vice president at Software AG.

The product, which is priced between \$16,100 and \$196,300, is part of the company's strategy to develop client/server software called Entire. Software AG originally introduced Entire 18 months ago as an OS/2-based scheme but revamped it in December 1991 to center around Microsoft Corp.'s

Windows [CW, Dec. 9, 1991].

Natural 2.2 is targeted at two sets of users: those who want to build new graphical applications on a mainframe and those who want to add a more user-friendly interface to existing applications, according to the company.

Aiming for appeal

The goal of Entire is to give all applications, no matter what kind of hardware hosts them, the same look and feel to personal computer and workstation users.

New with Natural 2.2 is an integrated debugging facility designed to let developers check work in progress.

Like other versions of Natural, the upgrade supports several databases, such as Software AG's Adabas, IBM's DB2 and Digital Equipment Corp.'s Rdb.

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As for maintenance, a Gartner Group study showed that, even back in 1990, more than 80% of IEF developers were getting gains of from 2-to-1 to 10-to-1.

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Richard F. Connell
VP, Information Technology
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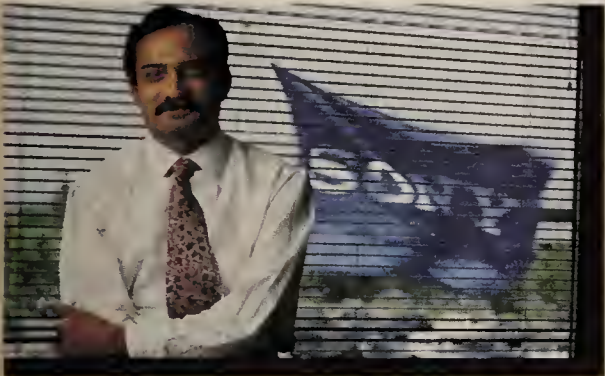
"MERLIN is mission-critical—the most far-reaching business systems initiative we've ever undertaken. Over 400 transactions are in production, with 800 more to be added in the next three months. We could not handle this scale and complexity without IE/IEF."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce Aerospace



"With previous methods, we would have had to compromise on an 'okay' 10-screen Lease Accounting system. With the IEF, our users got everything they wanted—an outstanding 40-screen system—in the same time. They are requesting the IEF for all future systems."

Tom Jeffery
Sr. VP, Information Systems
Target



"The IEF offers dramatic improvements in productivity, yet it's easy to learn. One example: We trained 23 developers, including 18 new hires, and then completed a large order processing system—300 transactions—all in only 20 months."

Venkat (Vinnie) Tiruvilumala
Director, CPC/PPC Information Systems
SONY Corporation



"We used an IEF frequent flyer template to build our 'Canadian Plus' system. A major redesign, estimated at 4-6 months using previous methods, took less than a month. Now we're providing better customer service, and maintenance costs are greatly reduced."

Bill Palm
President, Canadian Technology Services
Canadian Airlines



"Our new Customer Order Services Marketing Information System—over 500 transactions and 250 entities—is in production. Quality is excellent and our users are very pleased. Dedicated people armed with the IEF advantage have made COSMIS a success."

James R. Engle
Director, Systems and Programming
Rhône-Poulenc Rorer



"Your new IEF tutorial was a way to quickly become familiar with the IEF and see how the IEF will allow quality systems to be built very quickly. I feel I now know how to build systems using the techniques described."

Roger Strand
Application Development Consultant
First Federal Lincoln



"The IEF tutorial is very well done. I feel comfortable with this software and I have acquired the skills to build simple systems. The tutorial is a very fast and effective means of evaluating the capabilities of the IEF."

Margaret Kubaitis
Research Programmer, IS&S
University of Illinois



"The IEF tutorial is put together very well and quickly illustrates how to construct a system using the IEF. It gives one the basics to start getting the job done. I feel I am prepared now to build simple systems using the IEF."

K. E. Peacock
Data Administrator
City of Saskatoon, Saskatchewan

NEW PRODUCTS

Development tools

Synon Corp. has created Synon/CSG, a client/server application generator option for the Synon development environment.

Synon/CSG uses an IBM Application System/400 as the server, which is attached via Token Ring to client personal computers. In Synon/CSG applications, database access and manipulation processes take place on the server, while client systems handle user interface and information processing tasks.

The generator module with one driver costs \$24,000 to \$37,500. Additional driver copies cost \$4,000 to \$28,000.

One driver copy is required for each PC running the applications.

Synon
1100 Larkspur Landing Circle
Larkspur, Calif. 94939
(415) 461-5000

TeleSoft has announced Version 2.0.5 of the TeleUse graphical user interface (GUI) development tool.

The new version, available now for several different Unix workstations, can develop GUIs for C++ applications. It generates ANSI-compatible C language code and incorporates a new color Pixmap Editor.

A single copy costs \$7,500.

TeleSoft
5959 Cornerstone Court W.
San Diego, Calif. 92121
(619) 457-2700

Interactive Engineering Corp. has announced the WinPort set of cross-platform graphical user interface development tools.

WinPort provides equivalent libraries for native Microsoft Corp. Windows application programming interface functions, allowing users to port Windows applications to DOS, OS/2, Unix and other environments.

The first version available, which develops DOS text-mode versions of Windows programs, costs \$395 or \$695 including library source code. No royalties

are required.

Interactive Engineering
281 Lost Angel Road
Boulder, Colo. 80302
(303) 440-7674

Iconicon has created Iconicode, a visual programming environment for image processing and other applications.

Iconicode allows developers to select program operations from a menu and place them in hierarchical data-flow networks. The program can then be run directly in the environment while the display dynamically indicates the current point of execution, simplifying the debugging process.

The product runs on Sun Microsystems, Inc. Scalable Processor Architecture platforms and costs \$2,000. The imaging-specific version costs \$2,600.

Iconicon
624 University Ave.
Palo Alto, Calif. 94301
(415) 326-4266

Computer-aided software engineering

Visible Systems Corp. has added SQL Capture, a reverse-engineering tool, to its integrated computer-aided software engineering tool set.

Visible Analyst Workbench users can now create data models from existing database structures in a variety of database management systems.

The SQL Capture add-on costs \$1,000 for a single user license and \$2,600 per network for users on Novell, Inc. NetWare local-area networks.

Visible Systems
The Bay Colony Corporate Center
950 Winter St.
Waltham, Mass. 02154
(617) 890-2273

Utilities

Software Systems Design has developed a program that generates accurate Fortran header source-code comments.

FTN/HDR analyzes each module in a Fortran program and notes any routines it invokes, routines that call the module and arguments and global data used by the module.

Pricing ranges from \$50 for personal computers to \$350 for workstations and large systems.

Software Systems Design
3627 Padua Ave.
Claremont, Calif. 91711
(714) 625-6147

Systems Strategies, Inc. has added Unix support to its EzBridge Transact software.

EzBridge Transact provides messaging among different transaction processing environments, allowing users to develop distributed Unix applications that span several platforms. It provides recoverable queues, transaction routing and a simple applications programming interface on each system. Supported platforms include Unix, VMS, IBM and compatible mainframes, local-area networks and Tandem Computers, Inc. systems.

Pricing for the software ranges from \$10,000 to \$30,000.

Systems Strategies
1 Penn Plaza
New York, N.Y. 10119
(212) 279-8400



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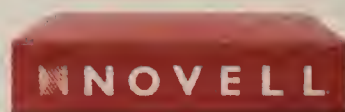
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The Past, Present, and Future of Network Computing.



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RISC desktop machines: PCs in disguise?

Dressed like PCs, workstations are starting to grace a few office desktops

BY ALAN RADDING

Two years ago, no one at the Teachers Insurance and Annuity Association in New York would have guessed that secretaries there would be clicking away on keyboards attached to, of all things, workstations based on the powerful reduced instruction set computing (RISC) chip.

Back then, the number-crunching, networking and multitasking capabilities of workstations were considered by the pension fund company to be overkill for running programs such as spreadsheets and word processors.

That power was reserved for the financial gymnastics performed by investment analysts who worked on Scalable Processor Architecture (SPARC) workstations, Sun Microsystems, Inc.'s version of RISC. Secretaries were given slower, less expensive and more businesslike IBM Personal Computer ATs and Personal System/2 Model 30s.

Everyone was quite happy with their desktop devices, but two events conspired to change this technology landscape: the availability of SPARC-based electronic-mail and calendaring applications and a drastic price drop of the Sun LPC, a low-end workstation that Sun has priced and configured in hopes of selling it into the hands of office workers.

Sun's strategy of introducing an under-\$5,000, low-end workstation — the same strategy used this year by all the workstation leaders, including IBM, Data General Corp., Digital Equipment Corp. and Hewlett-Packard Co. — played right into the hands of Rajeev Khanolkar, senior investment systems consultant at Teachers.

Khanolkar estimated that it

Radding is a free-lance writer based in Newton, Mass.

was easier, from the standpoint of support, training and data sharing, for the secretaries and analysts to do their E-mail and calendaring under a common graphical user interface — in this case, Sun's Open Windows windowing interface.

The secretaries would not have to give up their familiarity with Lotus Development Corp.'s 1-2-3 and WordPerfect Corp.'s WordPerfect word processing packages, which along with many other office applications have already crossed over to RISC from the DOS world.

Even though the LPC is a stripped-down base model with no hard drive and a black-and-white monitor (as are most of the low-cost workstations now being introduced), it is still less expensive than preparing the PCs for the new applications, even after bulking up storage to 12M bytes, adding a 120M-byte hard drive and purchasing a 16-in. color monitor.

"When you add in the cost of networking, windowing, Ethernet controllers and multiuser operating systems for PCs, SPARC is cheaper," Khanolkar says.

No mass exodus

By no means are the new low-cost RISC machines inspiring a mass migration among traditional business users. Companies best poised for an across-the-board conversion already have a sizable investment in workstations. Teachers Insurance will

have a total of 300 workstations when it finishes converting all the secretaries this year.

Other companies might consider RISC if they are planning to develop entirely new applications that would benefit from that environment.

"The only time we advise business clients to switch is when they are developing inte-

ning on a workstation with users at dedicated terminals. Since users need to be retrained on the new applications anyway, the company won't lose its training investment in DOS.

Dressed for business

But even though these machines won't be a hit in every shop, they are all dressed up and prepared



M. E. Cohen

grated sets of network-based applications," says Lee Rothstein, director of the advanced networking computing research service at New Science Associates, Inc. in Nashua, N.H.

These are usually suites of customized applications, such as customer service programs, run-

to enter a PC-dominated world.

For one thing, while RISC workstations have always been superior to PCs in price/performance, the gap widened this year. In January, HP demolished existing standards in low-price RISC workstations when it announced two new machines: the Series 700 Model 705 for \$4,990 and the Model 710 for \$9,390.

Based on 11 benchmark tests run by the Systems Performance Evaluation Cooperative (SPEC), a consortium involving almost two dozen RISC vendors (see story page 90), HP's new machines come in at a price/performance rating of \$147 per

Continued on page 86

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Service With a Smile

Workstation owners opt for comprehensive support. Page 86.

Product Guide

A listing of RISC workstations under \$10,000. Page 91.

Buyers' Scorecard

Sun tops user poll of desktop RISC workstations. Page 96.

Workstations start to grace office desktops

CONTINUED FROM PAGE 85

"SPECmark." That figure catapults HP past the previous low-price RISC market leaders, Sun (\$246 per SPECmark), DEC (\$245), DG (\$434) and Solbourne Computer, Inc. (\$300). The HP announcement completely pulled the rug out from under IBM's own January announcement of the RISC System/6000 Model 220, a 25-SPECmark machine with a \$6,345 base price and a rating of \$254 per SPECmark.

While the main attraction may appear to be price/performance, that's just the most obvious and most hyped feature on these machines.

In actuality, most people care more about availability of key applications, networking capability and postsale support and service, says Nancy Battey, director of workstation research at International Data Corp. in Mountain View, Calif., which conducted a survey of 200 workstation sites using 10 or more

RISC workstations.

Price/performance ranked third among reasons for choosing a RISC workstation, and raw power — specifically, high millions of instructions per second or SPECmark ratings — ranked ninth.

Copypcat RISCs

To that end, RISC workstation vendors are increasingly mimicking PC vendors by preloading the machine with an operating system, a windowing interface such as the Open Software Foundation's OSF/Motif or Open Windows and even some application software. Users can pull the machine out of the box, turn it on, answer a few configuration questions and be computing in minutes. HP charges \$75 for this service, while DEC and Sun include it.

The workstation vendors are also trying to bulk up their support services (see story below). "Workstations have very sophis-

ticated networking and are more demanding, so users need more vendor support and service than in the PC environment," says Tom Kucharvy, president of Summit Strategies, a consulting firm in Boston.

Despite workstation efforts to become more "PC-like," users may be dismayed when they see what is included in the base configurations of these systems, especially when they're used to spending \$5,000 to get a PC with a 32-bit I486 processor, a color monitor, multiple expansion slots, a 100M- to 200M-byte hard drive and goodies such as modems (see chart above).

The lowest price RISC workstations are weak, often handicapped siblings in a vendor's workstation family, typically

Bang for the buck
For \$5,000, take your choice

RISC-based desktop workstation	Intel-based 486 PC
<ul style="list-style-type: none"> • Slimline desktop configuration. • 20- to 25-MIPS CPU. • 8M- to 16M-byte, 32-bit RAM. • No hard disk; optional external SCSI drive. • Proprietary bus; no expansion slots. • 1,280- by 1,024-pixel graphics subsystem. • 17- to 19-in. monochrome monitor. • Ethernet controller. • Serial, parallel and external SCSI ports. • Keyboard and mouse. • System software with windowing interface. 	<ul style="list-style-type: none"> • Modular, upgradable CPU, video, I/O and memory subsystem configuration. • 50- to 25-MHz clock speed. • Numeric coprocessor. • 8M-byte, 32-bit RAM with 8K-byte cache. • 3 1/2-in., 1.44M-byte disk drive and 120M-byte SCSI hard drive. • EISA bus architecture with five EIS slots and two dedicated memory slots. • 1,024- by 768-pixel VGA graphics subsystem. • Optional monitor. • LAN adapter optional. • Serial and parallel mouse ports. • Keyboard and mouse. • System software optional.

CW Chart: Michael Siggins

lacking a hard disk and providing only 8M bytes of memory (except for IBM's machine, which provides 16M bytes of memory). Even low-end business users say that the machines require at least several thousand dollars to bring them up to acceptable configuration standards.

The vendors refer to them as entry-level workstations, but they work, in effect, like a bait-and-switch strategy — a way to commit users to the vendor's platform with the intention of selling the users up to a more costly machine.

The low memory and lack of

Choosy users want top service

BY BO CALDWELL

If there's one thing people are careful about when purchasing a reduced instruction set computing (RISC) workstation for commercial use, it's the quality and responsiveness of the vendor's service.

Not only do users rank service quality as one of their top concerns (see Buyers' Scorecard, page 96), but they also want a full menu of options. A survey conducted by Ledgeway/Dataquest, a market research firm in Lexington, Mass., indicated that a majority of workstation users are concerned with getting a comprehensive service plan (see chart at right).

Although some vendors have been criticized for not meeting the commercial sector's support requirements, that situation is already beginning to change [CW, March 9].

"People are increasingly using RISC workstations to run their businesses, and workstation manufacturers are working very hard at making sure they provide high-quality service and support," says Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass.

Workstation vendors offer a variety of service contracts, including same-day or next-day on-site service, a response time of less than one hour and carry-in

service to a regional center.

Monthly fees for RISC maintenance contracts run about \$10 to \$15 higher than those for Intel Corp.-based personal computers. While that may not sound like a significant difference, the actual replacement parts also tend to be more expensive, and because of the proprietary nature of RISC machines, they are not interchangeable from machine to machine.

Playing it safe

Such inconsistency leads many companies to continue service contracts with the vendor after the warranty has expired (see chart). The same is not true for PCs: Most Fortune 1,000 corporations use in-house information systems personnel to service PCs.

Another reason for the extended contracts, IS managers say, is that the workstation is a relative newcomer in commercial corporate sites, and managers are cautious about making sure they are covered — particularly with mission-critical applications.

Companies also tend not to keep inventories of workstation replacement parts on site, preferring to let the vendor supply them when necessary. That's seen as a cost-saver at Adaptive Corp., a maker of network switches in Redwood City, Calif.

Sun Microsystems, Inc. "has enabled us to have a very lean operation. We don't have to wor-

ry about parts being in stock because Sun can get us a part within 24 hours. We call and get an answer immediately," says Bruce Van Nice, director of marketing at Adaptive.

Better than expected

Most IS managers say the hardware itself is actually more reliable than it is on PCs. "Our failure rate has been basically zero," says Alan Perlman, data processing manager at the San Diego Housing Authority. He manages 300 Data General

Corp. Avion workstations.

Statistics back up those claims. In the UK, RISC-based networks had a 99.5% uptime, says Hugh Ryan, director of new age systems at Andersen Consulting in Chicago.

The breakdowns that workstation users do see have more to do with peripherals than with the actual machines. "It's more prevalent in things like 1/4-in. tape drives, CD-ROM drives, 8mm, the external devices," says Gary Kline, senior project manager at Eastman Kodak Co. in Rochester, N.Y. Kline manages an extensive Sun SPARCstation network and says he has had only one server go down in

five years and has had no problems with the desktop hardware.

What you really need to look out for are the hidden costs associated with installing workstations — including software, training and system administration — which tend to be significantly higher than with Intel-based PCs, Ryan says.

Software costs are high because software is more sophisticated and is generally not available off the shelf.

As for training, users usually require a couple of weeks for workstations, compared with the usual manual-reading required for PCs.

But the biggest hidden cost of installing RISC workstations comes from bringing internal IS support personnel up to speed, IS managers say.

"PC users who think they're going to just jump into workstation technology are in for a rude awakening," cautions Stephen Clancy, associate director of desktop services at Ledgeway.

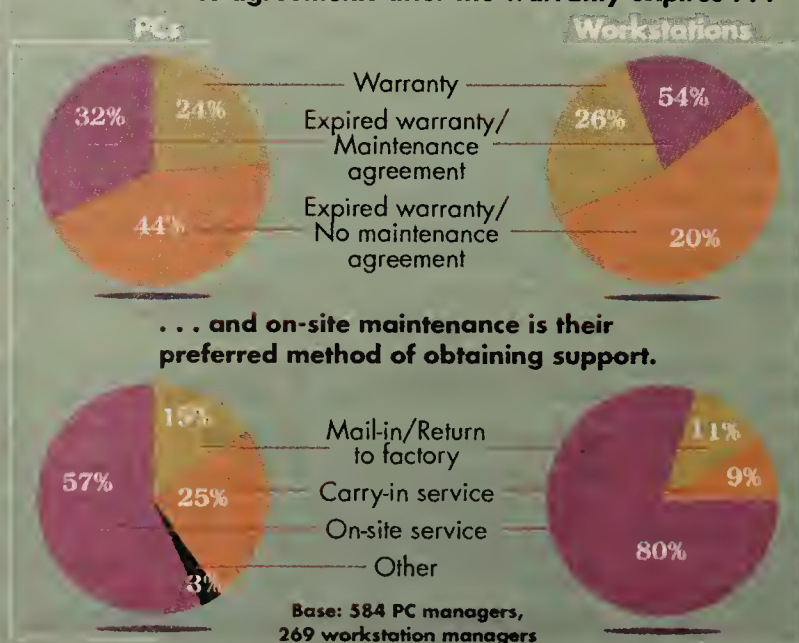
Ryan says he believes that the optimal ratio of RISC support staffers is one to every 40 or 50 users. Other users say one to 100 works fine, with the deciding factors being the size and complexity of the network and applications.

Finding the right person for the job of system administration is key. Brenda Vathauer, product marketing manager at Hewlett-Packard Co. in Mountain View, Calif., emphasizes that the administrator must be knowledgeable about Unix and should also know something about simple networking. •

Service mentality

PC and workstation users were questioned about their service and support policies

Workstation users are more likely to extend their maintenance agreements after the warranty expires . . .



Source: Ledgeway/Dataquest

CW Chart: Michael Siggins

hard disk is OK if you plan on using these systems as diskless workstations on a network (see story page 88). "You can't sit at one of these [entry-level machines] and do CAD," says John Logan, vice president at Aberdeen Group, a consulting firm in Boston. "But if you want to access CAD remotely and edit it, the answer is yes."

The low-end models also lack color, despite the fact that 83% of purchasers want color on their workstations, according to Workgroup Technologies, Inc. in Hampton, N.H.

At a minimum, any RISC workstation ought to have 12M bytes of memory and a 16-in. color monitor, "gray scale as the worst case," recommends William Willis, director of engineering computer operations at North Carolina State University in Raleigh.

Willis also demands an internal bus, such as DEC's Turbo Channel, or a daughterboard scheme, either of which can be used to expand the configuration.

Expandability is not a given with some low-cost workstations, however. On the HP 705, for instance, you can only have a black-and-white monitor. To upgrade to color, you'd have to buy the next machine in HP's line, the 710, which costs \$4,500 more. Sun's entry-level machine, the ELC, also has no provision for color — or an internal hard disk.

There are other anomalies that PC users will find disconcerting in this brave new world. For instance, you cannot freely move applications from one RISC ma-

OSF/1, a common Unix operating system from the OSF. Sun, however, continues to promote its own operating system, So-

laris, as a de facto standard.

As for availability of applications, developers have historically targeted the platform with the largest market first, which is currently Sun's SPARC platform (see chart at left). SPARC International, the organization promoting SPARC, claims more than 3,600 applications, classifying 30% of those as business/commercial. HP claims a total of 4,500 applications on its Precision Architecture chip.

Where does it run?

Application type also has a great influence on purchase decisions. Even though new HP machines would be ideal from a price/performance standpoint at TCI, Inc., a Mountain View, Calif.-based manu-

facturer of specialized broadcast antennae, the company is instead planning to move all its designers and engineers to low-cost Sun workstations, says Terry Stiner, senior systems administrator at the firm.

The reason is that the software the company runs isn't available on the HP platform.

With its massive investment in existing PC applications and user training and support, the computer industry is not going to stage a mass conversion to RISC on the desktop. What is likely to happen is that commercial organizations will add RISC workstations selectively — in departments or workgroups where RISC power offers clear advantages that outweigh the disruption of a conversion. •

Strong leadership

Sun is still the RISC leader, but this year's announcements may change future equations

	1990	1992*
Sun	29%	35%
HP	23%	16%
DEC	18%	12%
IBM	4%	9%
Other	26%	28%

(Percent of market share) *Projected

Source: Dataquest, Inc.

CW Chart: Janell Genovese

IF I GOT [another RISC machine] for free — a good machine — I'd still be wary because of the costs involved in support and training and moving applications."

BEN GOLUB
BLACKSTONE FINANCIAL

chine to another. Even the same applications look and run differently on different RISC platforms, and many specialized applications may not run on all the different flavors of RISC.

Concern over moving applications and users to a new version of RISC/Unix is so great that users tend to stick with a platform once they buy into it, even in organizations that have hit the limits of their current RISC/Unix platform.

"We topped out on the SPARC line a year ago. Now we're waiting for another chip from Sun," says Ben Golub, a partner at Blackstone Financial Management in New York.

Blackstone has used a variety of Sun workstations since 1988 to run its own investment risk analysis software as well as general business applications such as Lotus 1-2-3 and WordPerfect. Sun's new SPARC chip, which is code-named Viking, is expected to be introduced later this year.

"If I got [another RISC machine] for free — a good machine — I'd still be wary because of the costs involved in support and training and moving applications," Golub says.

The software portability problem may diminish as various vendors embrace Unix standards. For example, HP, DEC and IBM have all announced support for

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Options

Each of the leading, under-\$10,000 workstation models has something different to offer — and to be wary of. Here's a summary of each:

HP 705 (\$4,990)

- + Best performance in this price category and best integer performance next to the HP 710.
- No color support.
- Poor expansion options.

HP 710 (\$9,390)

- + Performance leader in its class.

IBM POWERstation 220

(\$6,345)

- + Second only to the HP 710 in floating-point performance.
- + Color upgrade under \$10,000.
- High cost per SPECmark.

DECstation Model 20 (\$3,995)

- + Upgradable to color.
- + Includes two Turbo Channel expansion slots and an audio speaker for multimedia.
- Lowest entry price but weak SPEC ratings.

DECstation Model 25 (\$4,995)

- + Includes on-board graphics and audio, Turbo Channel expansion board and Small Computer Systems Interface-2 interface for just under \$10,000.

Solbourne S4000 (\$3,995)

- + One of the lowest entry prices.
- Company's main focus is servers, not low-end workstations.

Sun SPARCstation ELC

(\$4,995)

- + Motherboard located behind the monitor, eliminating the need for a separate processor box and keeping the footprint small.
- Hard drives must be externally attached.
- No expansion potential.

Sun SPARCstation IPC

(\$6,995)

- + Lots of memory for the price, with 207M-byte drive.
- + Equipped with S Bus for expansion.

SPARC clones (*Base price generally runs 20% to 30% below comparable Sun list prices, but further discounting is rampant.*)

- + Performance comparable to older Sun models.
- + Differentiated not so much on basis of performance as on configuration, price, service and support.
- + Available in laptop and notebook configurations.
- Little-known vendors; may not have long-term staying power.

DG Aviiion AV 100, AV 210, AV 310 (\$3,995, \$5,950, \$9,995)

- + Low cost.
- Machines are optimized to work with the Aviiion multiprocessor RISC servers as part of a total hardware/software solution.

Workstation brains versus network brawn

It may seem strange to purchase an intelligent desktop machine without a hard drive, but it's quite common in the RISC world. That's mainly because RISC workstations are designed for networking, so they can rely on the server for storage.

But the choice isn't black and white: You can actually purchase workstations with various levels of local storage, balancing the price of the workstation you want with the performance you need on

the network:

• **Fully configured workstation.** A network-compatible workstation capable of full, stand-alone operation, with a 400M-byte or higher hard disk and 16M bytes of memory.

• **Dataless workstation.** A fully functional RISC workstation with a small hard drive (about 200M bytes). The workstation keeps some data in local storage but can also access a server on the network to

pull data down to its local hard drive.

Because it operates in a semi-independent fashion, it relieves demands on the server and network.

• **Diskless workstation.** A fully functional RISC workstation with no hard drive that must make calls to a server on the network to access both applications and data.

The presence of many active, diskless workstations can take a heavy toll on server and network performance.

• **X Window System terminal.** Slightly more intelligent than a dumb character terminal, enabling it to process graphics for display. Like any terminal, it is totally dependent on the server and the network, impacting the performance of both.

ALAN RADDING

Now you can and not get

Introducing new RISC System/6000 POWERstations

If you're interested in open systems but don't want to suffer the slings and arrows of outrageous prices, IBM is about to hit you where you live. The RISC System/6000™ POWERstation 220 gives you more wallop for your money, while delivering a hefty 25.9 SPECmarks.* That's compared to the SUN IPC's™ 13.4 SPECmarks and the DEC5000's™ 17.8.

Model	Entry Grayscale Workstation**	Entry 8-bit Color Workstation†
IBM 220W	\$7,185	\$9,995
HP 705/710	\$8,415	\$14,065

*In Canada, call 1 800 465-1234. **16MB, Paging Disk, Display, Operating System, Graphical User Interface. †16MB, 400MB Disk, Display, Operating System, Graphical User Interface. IBM is a registered trademark and RISC System/6000 is a trademark of International Business Machines Corporation. SPECmark is a geometric mean of the ten SPECmark tests and is a trademark of Standard Performance Evaluation Corporation. All SPECmark figures listed are as published by their respective manufacturers. All prices listed are MSRP. Reseller prices may vary. IPC is a trademark of Sun Microsystems, Inc. DEC5000 is a trademark of Digital Equipment Corporation. UNIX is a registered trademark of UNIX Systems Laboratories. HAGAR THE HORRIBLE Character(s) © 1992 King Features Syndicate, Inc. © 1992 IBM Corp.

Scientists see stars. CASE users can start with a grayscale workstation with a paging disk for just \$7,185. If it's CAD clout you're after, you can get a workstation specially outfitted for mechanical design—with 2D color graphics and 400MB of fixed disk storage—for only \$9,995. All models in the POWERstation 220 series come with two expansion



Portable RISC workstations: Don't leave work without 'em

BY JOHN MCDONOUGH

Just because you use a RISC workstation doesn't mean you're confined to working in your office. There are a few portable workstations available from SPARC clone makers that are well-suited for travel.

For the most part, these laptop machines are similar to their counterparts in the DOS world in terms of weight, price and battery power. However, they trounce Intel Corp. 80386-based laptops

McDonough is an editor at Faulkner Information Services, Inc., a Pennsauken N.J.-based publishing company.

in their CPU performance and memory and storage capacities.

All of the Scalable Processor Architecture (SPARC) portables run Sun Microsystems, Inc.'s SunOS or Solaris operating system and support Open Windows, Sun's graphical user interface. They are also equipped with modems and built-in Ethernet interfaces, which make it easy to communicate with office equipment.

James Morehead, a software engineer at Toronto-based Teleride Sage Ltd., uses one of the less expensive SPARC laptops, the SPARCbook 1 from Austin, Texas-based Tadpole Technology, Inc., to write computer-aided dispatch and ve-

hicle tracking applications for the transit authority.

Priced at \$4,950, the SPARCbook 1 weighs in at 6.8 pounds, runs at 18 million instructions per second (MIPS) and has 8M bytes of memory, an 85M-byte disk drive and a gray-scale display.

The price leaps to \$14,850 for a high-end unit, which comes with 32M bytes of memory, dual 120M-byte disk drives and a color monitor.

For office work, Morehead plugs the laptop into the network via the Ethernet interface. When he's out of the office, he just dials into the company's Sun-4 server with the laptop's built-in modem.

"The big plus for me is that it's binary-compatible [with the Sun-4], so I'm able to mount its hard disk and vice versa," Morehead says. "It means at the end of the day, I can pick up my machine and work on the train a little bit."

SPARCbook 1 comes bundled with Insignia Solution, Inc.'s SoftPB MS-DOS emulation package, enabling Morehead to also run Microsoft Corp.'s Word and Excel spreadsheets.

A similarly priced laptop line from Irvine, Calif.-based CMS Enhancements, Inc. offers the CMS-SLT100. The 7-pound system comes with 8M bytes of storage, a 120M-byte hard disk and 15.8-MIPS performance and sells for \$5,521.

On the other end of the price and weight spectrum is San Diego-based RDI Computer Corp.'s BriteLite, which sells for \$7,995 to \$14,995 and weighs from 13½ to 15 pounds with batteries. What you get for that extra heft and price is the Sun IPC motherboard.

That's just what the scientists at Los Alamos National Laboratories needed to acquire, analyze and display data that they

get more clout, clobbered.

and POWERservers that pack more punch for less.

slots and upgradable components. And industry-standard memory upgrades and add-ons for both are affordable, so growing won't be a pain.

Striking a blow for business. The POWERserver 220 is great for commercial UNIX® solutions, too. You can configure it as a commercial server, to give your business the speed, muscle and openness of UNIX, for only \$9,715. And the POWERserver 220 is as expandable as all our other models.

IBM is in your corner. Nobody else delivers the knockout support of IBM. An IBM customer engineer can install your

machines, configure your network and integrate all your systems, whether they're made by IBM or not. And IBM Credit Corporation has flexible financing packages to meet your needs. Get hit with the details. Call your IBM marketing representative or Business Partner. For literature, call 1 800 IBM-6676, ext. 769*.

And, for those who decide to shop for UNIX solutions elsewhere, a word of advice. Duck.



**The RISC System/6000
For the Power Seeker.**

RISC laptop tips

Following are 10 features to look for when buying a RISC-based laptop:

- Weight under 10 pounds.
- Binary compatibility with office systems.
- Full support of Unix applications that run on office systems.
- Strong networking support, such as an integrated Ethernet port.
- Large internal disk drive.
- Pointing device integrated into keyboard.
- Built-in modem/fax board.
- High-resolution (1,024 by 768 pixels) display to support windowing environment.
- SCSI port for external disk drives.
- External monitor port for on-the-road presentations.

CW Chart: Janell Genovese

gather at exploration sites to launch satellites into orbit.

Prior to the BriteLite, the scientists used portable personal computers, but they did not offer enough disk capacity and processing power, says Darrell Call, section leader.

The government-funded organization chose a \$9,995 BriteLite version with 32M bytes of memory, a 120M-byte disk drive and a 1,152- by 900-pixel resolution screen.

The BriteLite's monochrome LCD, Call says, has a graphics resolution comparable to a Sun workstation, which is needed to fully support the Open Windows interface. The resolution "is way beyond anything that you see on a PC," Call says. "The way Open Windows runs on a Sun workstation, you wind up with a whole bunch of windows on a screen at once, and if you don't have resolution, it's nearly unreadable."

Although the selection is so far limited to the SPARC world, other vendors may come out with portables based on other versions of RISC, including the Alpha RISC chip, says David Mac, vice president of business services at Workgroup Technologies, Inc.

Benchmarking total system performance

BY PHIL MAGNEY

Price/performance may not be the top concern for buyers of low-end workstations, but benchmark performance results eventually do play an important role in the purchase decision. After all, one of the primary reasons people buy workstations is because their applications demand extra performance.

As most people now realize, benchmark numbers are not to be taken at face value. You need to match the appropriate benchmark with the intended application. For example, floating-point performance is most crucial for highly scientific and other number-crunching applications. Disk and memory performance are important for commercial database or transaction processing.

It's harder to apply benchmarks to business environments because the workstation is likely

Magney is general manager for ARS/Workstation Laboratories, an independent hardware testing lab located in Irving, Texas.

to run several applications, just as personal computers do. In this scenario, it's most important to find a system that's well-balanced. It should offer good performance in the four major areas — graphics, CPU, floating point and disk I/O — as well as those that are less obvious (and more difficult to measure), including virtual memory, compiler efficiency and the operating system.

That kind of measurement goes beyond the classic benchmarks that measure only one aspect of the machine, such as floating point (Whetstones and Linpack) and CPU (Dhrystones and millions of instructions per second).

More recent benchmarks such as SPEC (from the Systems Performance Evaluation Cooperative) and Khornerstone (from ARS/Workstation Laboratories) take a different approach. Both are based on multiple tests, each measuring a different aspect of the computer. SPEC includes 10 tests that measure CPU and floating point, and Khornerstone includes 21 tests that measure

CPU, floating point and disk I/O.

The objective of both benchmarks is to develop a rating that represents real-world performance. While the only way to really determine this is to benchmark using the actual software application, doing so is expensive because a version of the software applications would have to be purchased for each of the platforms under consideration.

We ran our benchmarks, including SPEC, on several leading entry-level workstations. The results (see chart) may differ from vendor claims because Workstation Labs runs its benchmarks using only available system software and hardware. Often, vendor claims will include results obtained using prereleased versions of the hard-

Benchmark-orama

The following models were tested in configurations appropriate for running the benchmark test. Sun ELC and HP 9000/400t were tested in a diskless configuration.

	Tested price*	Khornerstone	SPEC	Price/SPEC
Sun ELC	\$4,995	21,055	15.2	\$329
HP 9000/400t	\$4,995	10,721	NA	NA
CompuAdd SS1	\$9,695	14,427	7.4	\$1,310
Trigem SLT100	\$9,950	10,139	7.5	\$1,327
Tatung 5020CX	\$9,995	10,378	7.5	\$1,333
IBM Powerserver 220	\$10,275	62,870	20.5	\$501
Opus 5000 Model 5120	\$12,995	13,235	NA	NA
Sun IPX	\$13,495	29,111	18.4	\$733
Orange 2000	\$13,900	17,681	9.9	\$1,404
Sony NWS-3250	\$14,100	25,573	10.5	\$1,343
Mobius PWS 433	\$14,450	15,023	NA	NA
HP 9000/425e	\$15,490	42,753	10.3	\$1,504
DECstation 5000/120PXG	\$19,995	20,039	12.1	\$1,653
Silicon Graphics Indigo	\$21,250	92,032	NA	NA
Data General Avion 310	\$26,800	13,233	9.8	\$2,735

* Test price is higher than base price.

NA indicates either that the system would not run the benchmark or that ARS/Workstation Laboratories did not have the benchmark at the time.

Source: ARS/Workstation Laboratories

CW Chart: Janell Genovese

ware and/or system software. These performance figures are not wrong, but they are often higher when calculated this way.

The prices for most of the workstations listed include the complete hardware cost at the

time of purchase. Many systems have base prices between \$5,000 and \$10,000, but adding additional memory and disk storage (for purposes of running the benchmarks) raised the cost of many of the models. •



Just A R

RISC workstations under \$10,000

VENDOR	PRODUCT	CHIP TYPE	VERSION OF UNIX BUNDLED	BYTES OF RAM (BASE CONFIGURATION/MAXIMUM)	INTERNAL HARD DISK CAPACITY (BYTES, BASE CONFIGURATION)	CACHE SIZE (BYTES)	MAXIMUM PROCESSOR SPEED IN BASE CONFIGURATION (MHZ)	PERFORMANCE IN MIPS (BASE CONFIGURATION)	PERFORMANCE IN SPECMARKS (BASE CONFIGURATION)	CONTROLLERS INCLUDED	PROTOCOLS SUPPORTED	NUMBER OF PORTS INCLUDED	INTERNAL BUS TYPES SUPPORTED	MONITOR TYPE (BASE CONFIGURATION)	GRAPHIC SUBSYSTEM	SCREEN SIZE (DIAGONAL INCHES)	RESOLUTION (PIXELS)	PRICE
Alpha Microsystems (714) 957-8500	AM-9020	Motorola	Motorola 88 Open	16M/32M	180M	128K	25	33	NP	SCSI-1	TCP/IP, NFS	4 serial, 1 parallel	VME	Color, monochrome	Frame buffer	14	800 x 600	\$9,835
Aries Research, Inc. (510) 659-1544	Marix Workstation	SPARC	Sun OS	8M/164M	208M	64K	40	28.5	18.5	SCSI-1	TCP/IP, NFS, ONC	2 serial, 1 audio, mouse, 1 parallel	Sbus	Monochrome	Frame buffer	16	1,152 x 900	\$9,995
ASC Systems (313) 882-1133	SupraComputer	Intel RISC, 486	None	8M/512M	320M	64K	50	25-30	15	SCSI-1	TCP/IP, LAN/Networks	2 serial, 1 audio, mouse, 2 parallel	Proprietary	Color, monochrome	Accelerated graphic	14	1,280 x 1,024	\$4,860
CMS Enhancements, Inc. (714) 222-6666	CMS-SDT400	SPARC	Sun OS, Solaris 1.0	16M/60M	207M	64K	40	28.5	21	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 SCSI-2, 1 Ethernet	Sbus	Color	Accelerated graphic	20	1,152 x 900	\$9,677
	CMS-SDT250	SPARC	Sun OS, Solaris 1.0	8M/48M	205M	64K	25	15.8	10	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 SCSI-2, 1 Ethernet	Sbus	Color	Frame buffer	20	1,152 x 900	\$6,048
	CMS-SDT200	SPARC	Sun OS, Solaris 1.0	8M/48M	205M	64K	20	12.5	8.3	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 SCSI-2, 1 Ethernet	Sbus	Color	Frame buffer	20	1,152 x 900	\$4,903
CompuAdd Computer Corp. (800) 688-6380	CompuAdd SS 2 Workstation	SPARC	Sun OS	8M/128M	240M	64K	40	28.5	25	SCSI-1	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 Ethernet, 1 SCSI	Sbus	Color	Frame buffer	16	1,152 x 900	\$9,395
	SS.1+	SPARC	Sun OS	8M/128M	Diskless	64K	25	15.8	11.8	SCSI-1	TCP/IP, NFS	2 serial, 1 audio, mouse, Ethernet, SCSI	Sbus	Monochrome	Frame buffer	19	1,152 x 900	\$4,695

¹Will begin shipping April 1992. ²Performance optimization with enhanced RISC. ³Silicon Graphics and Mips have announced a merger, expected to be completed by June 1992.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

Reminder That We've

RISC DESKTOP MACHINES
PRODUCT SPOTLIGHT

VENDOR	PRODUCT	CHIP TYPE	VERSION OF UNIX BUNDLED	BYTES OF RAM (BASE CONFIGURATION/MAXIMUM)	INTERNAL HARD DISK CAPACITY (BYTES, BASE CONFIGURATION)	CACHE SIZE (BYTES)	MAXIMUM PROCESSOR SPEED IN BASE CONFIGURATION (MHZ)	PERFORMANCE IN MIPS (BASE CONFIGURATION)	PERFORMANCE IN SPECMARKS (BASE CONFIGURATION)	CONTROLLERS INCLUDED	PROTOCOLS SUPPORTED	NUMBER OF PORTS INCLUDED	INTERNAL BUS TYPES SUPPORTED	MONITOR TYPE (BASE CONFIGURATION)	GRAPHIC SUBSYSTEM	SCREEN SIZE (DIAGONAL INCHES)	RESOLUTION (PIXELS)	PRICE
Control Data Corp. (612) 482-4869	Desktop Workstation (910B-230)	Mips	IRIX Version 4.0	8M/96M	200M	32K	33	30	26.3	SCSI-2	TCP/IP, NFS, DECnet, 3270	2 serial, 5 audio, mouse, 1 parallel, 1 external SCSI	GIO	Color	Proprietary	16	1,024 x 768	\$9,995
Data General Corp. (508) 366-8911	Avion AV 310 Workstation	Motorola	NA	8M/112M	Diskless	16K	20	23	10.2	SCSI-1, Ethernet LAN	TCP/IP, NFS, OSI	2 serial, mouse	Proprietary	Color	Accelerated graphic	19 diagonal	1,280 x 1,024	\$9,995
	Avion AV 210 Workstation	Motorola	NA	8M/112M	Diskless	16K	20	23	10.2	SCSI-1, Ethernet LAN	TCP/IP, NFS, OSI	2 serial, mouse	Proprietary	Monochrome	Accelerated graphic	20 diagonal	1,280 x 1,024	\$5,950
	Avion AV 100 Workstation	Motorola	NA	8M/16M	Diskless	16K	16.7	19	8.7	SCSI-1	TCP/IP, NFS, OSI	2 serial, mouse, 1 SCSI	Proprietary	Monochrome	Accelerated graphic	20 diagonal	1,280 x 1,024	\$3,995
Digital Equipment Corp. (800) 344-4825	DECstation 5000 Model 125	Mips	OSF/1, Ultrix	8M/128M	Diskless	128K	25	26.8	19.3	SCSI-2	TCP/IP, NFS, SNMP	3 serial, 1 audio, mouse, 3 Turbo Channel	Turbo Channel	Monochrome	Frame buffer	19	1,280 x 1,024	\$6,495
	Personal DECstation 5000 Model 25	Mips	OSF/1, Ultrix	8M/40M	Diskless	128K	25	26.7	19.1	SCSI-2	TCP/IP, NFS, SNMP	2 serial, 1 audio, mouse, 2 Turbo Channel	Turbo Channel	Monochrome	Frame buffer	17	1,024 x 768	\$4,995
	Personal DECstation 5000 Model 20	Mips	OSF/1, Ultrix	8M/40M	Diskless	128K	20	21.6	16.3	SCSI-2	TCP/IP, NFS, SNMP	2 serial, 1 audio, mouse, 2 Turbo Channel	Turbo Channel	Monochrome	Frame buffer	17	1,024 x 768	\$3,995
	DECstation 5000 Model 133	Mips	OSF1, Ultrix	8M/128M	Diskless	192K	33	34.42	25.5	SCSI-2	TCP/IP, NFS, SNMP	3 serial, mouse, 3 Turbo Channel	Turbo Channel	Monochrome	Frame buffer	19	1,280 x 1,024	\$8,495
DTK Computer, Inc. (818) 810-8880	DTK Station 2	SPARC	Sun OS	16M/64M	207M	64K	40	29	NA	SCSI-2	NFS	2 serial, 1 audio, 1 Ethernet	Sbus	Color	Frame buffer, accelerated graphic	20	1,152 x 900	\$9,300
	DTK Station 2 VME	SPARC	Sun OS	8M/64M	207M	64K	40	33	NA	SCSI-2	NFS	2 serial, 1 parallel, 1 Ethernet	VME	Color, monochrome	Frame buffer	20 (color), 17 (monochrome)	1,152 x 900	\$9,200
	DTK Station VME	SPARC	Sun OS	8M/64M	207M	64K	33	21	NA	SCSI-2	NFS	2 serial, 1 parallel, 1 Ethernet	VME	Color, monochrome	Frame buffer	20 (color), 17 (monochrome)	1,152 x 900	\$7,800
	DTK Station 1	SPARC	Sun OS	8M/64M	207M	60K	25	16	NA	SCSI-2	NFS	2 serial, 1 audio, 1 Ethernet	Sbus	Color, monochrome	Frame buffer	20 (color), 17 (monochrome)	1,152 x 900	\$6,795

Been Printing Long

VENDOR	PRODUCT	CHIP TYPE	VERSION OF UNIX BUNDLED	BYTES OF RAM (BASE CONFIGURATION/MAXIMUM)	INTERNAL HARD DISK CAPACITY (BYTES, BASE CONFIGURATION)	CACHE SIZE (BYTES)	MAXIMUM PROCESSOR SPEED IN BASE CONFIGURATION (MHZ)	PERFORMANCE IN MIPS (BASE CONFIGURATION)	PERFORMANCE IN SPECMARKS (BASE CONFIGURATION)	CONTROLLERS INCLUDED	PROTOCOLS SUPPORTED	NUMBER OF PORTS INCLUDED	INTERNAL BUS TYPES SUPPORTED	MONITOR TYPE (BASE CONFIGURATION)	GRAPHIC SUBSYSTEM	SCREEN SIZE (DIAGONAL INCHES)	RESOLUTION (PIXELS)	PRICE
First Computer Systems, Inc. (404) 441-1911	FCS 486-50 MHz	OPTI	NA	8M SIMS/32M on-board	200M	64K	50	22	NP	IDE	Depends on network card	1 serial, mouse, 1 parallel, 1 game	ISA	Color	Graphic card	14	1,024 x 768	\$2,999
	FCS 486-33 MHz Local Bus	OPTI	NA	8M SIMS/32M on-board	200M	64K	50	14.7	NP	IDE	Depends on network card	1 serial, mouse, 1 parallel, 1 game	ISA	Color	ET 4000 Local Bus, VGA card	14	1,024 x 768	\$2,799
	FCS 486-33 MHz	OPTI	NA	8M SIMS/32M on-board	200M	64K	50	14.7	NP	IDE	Depends on network card	1 serial, mouse, 1 parallel, 1 game	ISA	Color	Graphic card	14	1,024 x 768	\$2,599
Hewlett-Packard Co. (415) 857-1501 (800) 752-0900	HP Apollo 9000 Model 710	HP	HP-UX	16M/64M	Diskless	64K data, 32K instructions	50	57	49.7	SCSI-2	TCP/IP, NFS, Ethernet, NCS, BSD 4.3 network services, BSD 4.3 ARPA Services	2 serial, 1 audio, mouse, 1 centronics, 1 HP-HIL	None	Gray scale	Accelerated graphic	19	1,280 x 1,024	\$9,490
	HP Apollo 9000 Model 705	HP	HP-UX	8M/64M	Diskless	64K data, 32K instructions	35	35	34	SCSI-2	TCP/IP, NFS, Ethernet, NCS, BSD 4.3 network services, BSD 4.3 ARPA Services	2 serial, 1 audio, mouse, 1 centronics, 1 HP-HIL	None	Gray scale	Accelerated graphic	19	1,280 x 1,024	\$4,990
IBM (800) 426-3333	RISC System/6000 Powerstation 220 ¹	IBM Power ²	AIX	16M/64M	400M	8M	33	NP	25.9	SCSI-1	TCP/IP, NFS, SNA, OSI, XNS, DECnet, IPX	2 serial, 1 audio, mouse, tablet	Proprietary	Color, monochrome, gray scale	Frame buffer, accelerated graphic	19 (monochrome and gray scale), 16 (color)	1,280 x 1,024 (monochrome and gray scale), 1,024 x 768 (color)	\$8,295 - \$9,995, depending on monitor
Mars Microsystems, Inc. (412) 934-1040	Mariner 4i	SPARC	Sun OS	8M/96M	314M	64K	25	17	13	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse	ISA	Color	Frame buffer	15, 17, 19	1,152 x 900	\$8,995
Mips Computer Systems, Inc. ³ (408) 720-1700	Magnum 3000/33	Mips	RISC/OS 5.0	8M/128M	Diskless	32K	33	41.5	25.1	SCSI-1	TCP/IP, NFS	1 parallel	ISA	Monochrome	Frame buffer	17	1,152 x 900	\$9,900
	Magnum 3000/25	Mips	RISC/OS 5.0	8M/128M	Diskless	32K	25	30.8	18.6	SCSI-1	TCP/IP, NFS	2 serial, 1 parallel	ISA	Monochrome	Frame buffer	17	1,152 x 900	\$7,990

er Than Any Other

VENDOR	PRODUCT	CHIP TYPE	VERSION OF UNIX BUNDLED	BYTES OF RAM (BASE CONFIGURATION/MAXIMUM)	INTERNAL HARD DISK CAPACITY (BYTES, BASE CONFIGURATION)	CACHE SIZE (BYTES)	MAXIMUM PROCESSOR SPEED IN BASE CONFIGURATION (MHZ)	PERFORMANCE IN MIPS (BASE CONFIGURATION)	PERFORMANCE IN SPECMARKS (BASE CONFIGURATION)	CONTROLLERS INCLUDED	PROTOCOLS SUPPORTED	NUMBER OF PORTS INCLUDED	INTERNAL BUS TYPES SUPPORTED	MONITOR TYPE (BASE CONFIGURATION)	GRAPHIC SUBSYSTEM	SCREEN SIZE (DIAGONAL INCHES)	RESOLUTION (PIXELS)	PRICE
Mobius Computer Corp. (510) 460-5252 (800) 662-4871	Mirage Series, IPS/2	SPARC	Sun OS	16M/64M	Diskless	64K	40	28.5	22	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 Ethernet, 1 external SCSI-1	Sbus	Color	Frame buffer	17	1,152 x 900	\$8,890
	Protege Series P450i	Intel 486	Sunsoft, SCO, Open Desktop	8M/32M	213M	64K	50	30	NP	SCSI-1	TCP/IP, NFS	2 serial, mouse, 1 Ethernet, 2 parallel	ISA	Color	Accelerated graphic	14	1,024 x 768	\$7,180
	Mirage Series IPS/1+	SPARC	Sun OS	8M/64M	340M	64K	25	15.8	11.8	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 Ethernet, 1 external SCSI-2	Sbus	Color	Frame buffer	17	1,152 x 900	\$6,990 (full disk), \$4,990 (diskless)
	Protege Series P433i	Intel 486	Sunsoft, SCO, Open Desktop	8M/32M	213M	64K	33	20	NP	SCSI-1	TCP/IP, NFS	2 serial, mouse, 2 parallel, 1 Ethernet	ISA	Color	Accelerated graphic	14	1,024 x 768	\$5,390
Opus Systems, Inc. (415) 960-4040	Personal Mainframe 5124	SPARC	Sun OS, Solaris 1.0	16M/64M	207M	64K	40	29	21	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 Ethernet	Sbus	Color	Frame buffer	19	1,152 x 900, 1,024 x 768	\$9,725
	Personal Mainframe 5120	SPARC	Sun OS, Solaris 1.0	8M/64M	207M	64K	25	15.8	10.6	SCSI-1	TCP/IP, NFS	2 serial, 1 audio, mouse, 1 Ethernet	Sbus	Color	Frame buffer	19	1,152 x 900, 1,024 x 768	\$6,795
Orange Systems (301) 840-9405 Ext. 221	Orange Series 2000	SPARC	Sun OS	8M/96M	207M	64M	25	17.3	12.3	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse, Ethernet, SCSI-1	ISA	Color, monochrome	None	19	1,152 x 900, 640 x 480	\$8,100
Siemens Nixdorf Information Systems, Inc. (617) 273-0480	RW Workstation	Mips	IRIX	8M/32M	200M	32K	33	30	26	SCSI-1	TCP/IP, NFS	2 serial, 5 audio	VME, GIO	Color, monochrome	None	16, 19	1,024 x 768	\$7,995 - \$10,000, depending on screen size and monitor
Silicon Graphics, Inc. ³ (415) 960-1980 (800) 800-7441	IRIS Indigo	Mips	IRIX	8M/96M	Diskless	32K	33	30	26	SCSI-2	TCP/IP, NFS	2 serial, 5 audio, 1 Ethernet, 1 SCSI-II, 1 bidirectional parallel	Proprietary	Color	2-D and 3-D graphics built in	16	1,024 x 768	\$7,995

Laser Maker.

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VENDOR	PRODUCT	CHIP TYPE	VERSION OF UNIX BUNDLED	BYTES OF RAM (BASE CONFIGURATION/MAXIMUM)	INTERNAL HARD DISK CAPACITY (BYTES, BASE CONFIGURATION)	CACHE SIZE (BYTES)	MAXIMUM PROCESSOR SPEED IN BASE CONFIGURATION (MHZ)	PERFORMANCE IN MIPS (BASE CONFIGURATION)	PERFORMANCE IN SPECMARKS (BASE CONFIGURATION)	CONTROLLERS INCLUDED	PROTOCOLS SUPPORTED	NUMBER OF PORTS INCLUDED	INTERNAL BUS TYPES SUPPORTED	MONITOR TYPE (BASE CONFIGURATION)	GRAPHIC SUBSYSTEM	SCREEN SIZE (DIAGONAL INCHES)	RESOLUTION (PIXELS)	PRICE
Solbourne Computer, Inc. (303) 772-3400	S4000DX	SPARC	Sun OS, Solbourne OS/MP	8M/128M	200M	256K	36	28.3	18.3	SCSI-1	TCP/IP, NFS, asynchronous	1 serial, 1 audio, mouse	Sbus	Color	Solbourne SGA20	19	1,152 x 900	\$4,995
Sun Microsystems Computer Corp. (415) 960-1300	SPARCstation IPC	SPARC	Solaris	8M/48M	207M	64K	25	17.8	13.5	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse	Sbus	Color, monochrome	None	16, 19 (color); 17, 19 (monochrome)	1,152 x 900	\$6,495 - \$8,995, depending on screen size and monitor
	SPARCstation ELC	SPARC	Solaris	8M/64M	Diskless	64K	33	23.7	20.3	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse	None	Monochrome	None	17	1,152 x 900	\$4,995
Tatung Science and Technology, Inc. (408) 435-0140	Compstation 40	SPARC	Sun OS, Solaris 1.0.1	8M/128M with add-on cards	207M	64K	40	28.5	24.7	SCSI-2	TCP/IP, NFS, Ethernet, asynchronous, synchronous	2 serial, 1 audio, 1 SCSI, 1 RS-232, 1 Ethernet	Sbus	Color	Accelerated graphic	19	1,280 x 1,024, 1,152 x 900	\$9,990
	Compstation 25	SPARC	Sun OS	8M/128M with add-on cards	207M	64K	25	15.8	10.25	SCSI-2	TCP/IP, NFS, Ethernet, asynchronous, synchronous	2 serial, 1 audio, 1 SCSI, 1 RS-232, 1 Ethernet	Sbus	Color	Frame buffer	19	1,280 x 1,024, 1,152 x 900	\$5,290
	Micro Compstation	SPARC	Sun OS	8M/128M with add-on cards	207M	64K	20	12.5	8.3	SCSI-2	TCP/IP, NFS, Ethernet, asynchronous, synchronous	2 serial, 1 audio, 1 SCSI, 1 RS-232, 1 Ethernet	Sbus	Color	Frame buffer	15	1,280 x 1,024, 1,152 x 900	\$4,290
Trigem (619) 552-4949	SDT-250	SPARC	Sun OS	8M/48M	205M	64K	25	15.8	10	SCSI-2	TCP/IP, NFS, Ethernet, ONC	Mouse	Sbus	Color	Frame buffer	19	1,152 x 900	\$5,995
Twinhead Co. (408) 945-0808	TwinStation	SPARC	Sun OS	16M/128M	525M	64K	40M	31	24.7	SCSI-2	TCP/IP, NFS	2 serial, 1 audio, mouse	Sbus	Color	Frame buffer	20	1,152 x 900	\$9,995
Xerox Corp. (800) 835-9013	Xerox 6520	SPARC, SPARC-RISC	Sun OS	8M/48M	207M	64	25	17.4	11.8	SCSI-2	TCP/IP, XNS	2 serial, 2 Sbus, 1 Ethernet	Sbus	Color, monochrome	None	17, 19 (monochrome), 16 (color)	1,152 x 900	\$7,495 - 9,495, depending on screen size and monitor

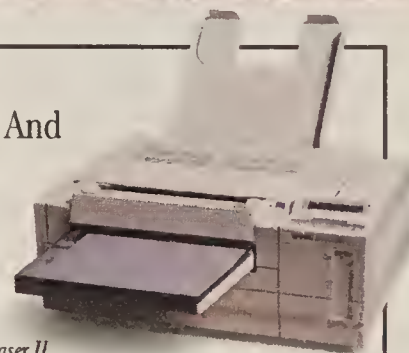
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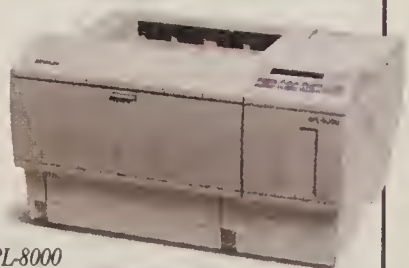
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BUYERS' SCORECARD

SPARCstation IPC/IPX tops desktop charts

BY DEREK SLATER
CW STAFF

There's more to buying a workstation than finding the fastest box.

So say users polled in *Computerworld's* Buyers' Scorecard on desktop reduced instruction set computing (RISC) workstations. Networking capability emerged as the single most significant issue, with an 8.8 importance rating on a scale of 1 to 10. Overall system performance was also out-placed by value for the dollar, which ranked second in importance.

Sun Microsystems, Inc.'s SPARCstation IPC/IPX earned a first-place rating based primarily on its networking capabilities and value for the dollar. Sun users gave their product an overall score of 76 out of 100.

Sharing second place with scores of 74 were IBM's RISC System/6000 Model 320H and Digital Equipment Corp.'s DECstation 5000 Model 25. Hewlett-Packard Co.'s HP Apollo Model 720 finished third with a score of 73 overall.

Scores are based solely on ratings given by current users of the products. Users rated only their own workstation, assigning it a 1-to-10 rating in each of 17 areas.

Overall scores were determined by multiplying the mean rating each user group gave its product by the mean importance rating for each category. Scores were then converted to base 100.

Users of the SPARCstation gave it the highest rating in 10 of the 17 areas measured. Software proved to be one of the SPARCstation's advantages: The Sun product took first

place by significant margins in availability of development tools (7.9), availability of applications (7.6) and functionality of operating system (8.2).

Less impressive were the SPARCstation's grades in service areas: Sun finished fourth in both quality of vendor support (7.1) and responsiveness of vendor service (7.0). Sun officials say the company has recently taken steps to address this weakness [CW, March 9]. The SPARCstation's lowest score overall came in video performance (7.0).

The second-place contenders, the RS/6000 320H and DECstation 5000 25, distinguished themselves in different areas.

The RS/6000 did well in performance categories and, secondarily, in service. Its best score came in processor speed (8.4); it also fared well in overall system performance (8.2), disk speed (7.8) and responsiveness of vendor service (7.9).

Users indicated very high satisfaction with the DECstation 5000 25's service and support: It received an 8.3 for quality of support and 8.4 for responsiveness of vendor service. The system finished second in a number of other categories, including functionality of operating system (7.3) and ease of use (7.6). It finished lower in performance issues.

The HP Apollo 720 model earned very high marks in speed categories, finishing second in overall system performance (8.1) and first in processor speed (8.7) and video performance (8.0). However, it lagged behind the other systems in networking capability (7.6), functionality of operating system (6.7) and ease of use (7.2).



Desktop RISC workstations

Total scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: Sun, 50; IBM, 40; DEC, 30; HP, 30.

Product	Highest ratings	Lowest ratings
Sun Microsystems' SPARCstation IPC/IPX SCORE 76	Networking capability Functionality of operating system Availability of development tools	Effective video performance Responsiveness of vendor service Quality of vendor support
IBM's RISC System/6000 Model 320H SCORE 74	Effective processor speed Overall system performance Networking capability	Quality of documentation Availability of development tools Availability of applications
DEC's DECstation 5000 Model 25 SCORE 74	Responsiveness of vendor service Quality of vendor support Networking capability	Configurability Expandability Effective disk speed
Hewlett-Packard's Apollo 720 SCORE 73	Effective processor speed Overall system performance Effective video speed	Availability of upgrade options Availability of applications Functionality of operating system

Users' ratings in performance areas reflect the results of independent tests. HP's entry clearly provides higher SPECmark ratings than the other models, weighing in at more than 55 SPECmarks, according to benchmarks performed by ARS/Workstation Laboratories.

The SPARCstation IPC/IPX, by

comparison, provides approximately 18 SPECmarks.

In a separate question asking users to rate their overall satisfaction with the systems, users rated the DECstation 5000 25 at 8.0, followed by the SPARCstation (7.7), RS/6000 320H (7.7) and HP Apollo 720 (7.5). •

KEY RATINGS

Sun's SPARCstation IPC/IPX tops three categories, including that of prime importance to users: networking capability. DEC takes second in that area, while achieving the highest rankings in service-related areas.

User importance rating:

(Detailed ratings on next page)

8.8 Networking capability

SPARCstation IPC/IPX	8.4
DECstation 5000 25	8.1
RS/6000 320H	7.9
HP Apollo 720	7.6

8.7 Value for the dollar

SPARCstation IPC/IPX	7.8
HP Apollo 720	7.7
RS/6000 320H	7.6
DECstation 5000 25	7.2

8.4 Overall system performance

RS/6000 320H	8.2
HP Apollo 720	8.1
SPARCstation IPC/IPX	7.9
DECstation 5000 25	7.8

8.2 Functionality of operating system

SPARCstation IPC/IPX	8.2
DECstation 5000 25	7.3
RS/6000 320H	7.2
HP Apollo 720	6.7

8.1 Quality of vendor support

DECstation 5000 25	8.3
RS/6000 320H	7.4
HP Apollo 720	7.3
SPARCstation IPC/IPX	7.1

8.1 Responsiveness of vendor service

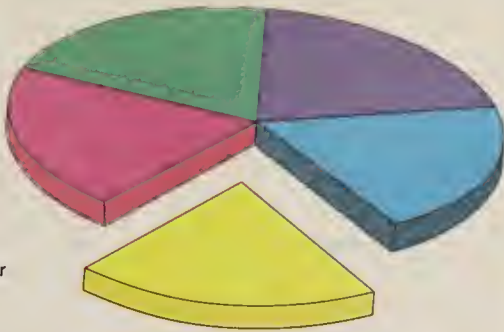
DECstation 5000 25	8.4
RS/6000 320H	7.9
HP Apollo 720	7.5
SPARCstation IPC/IPX	7.0

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 - 90. Others
- (Please specify)

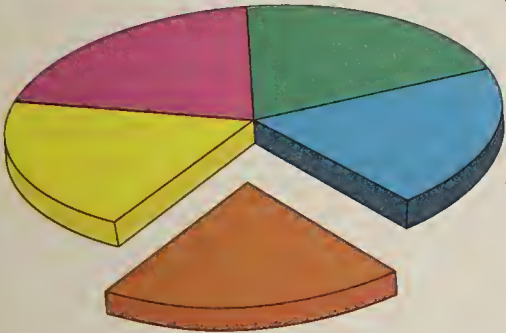
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 - 75. User: Other
 - 95. Vendor: Other
- (Please specify)

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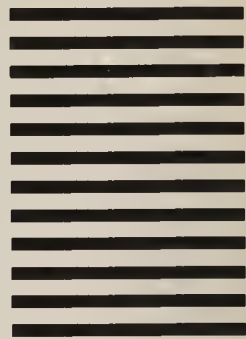
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A CLOSER LOOK

Desktop RISC workstations
(continued from previous page)

The first-place SPARCstation takes high score in seven more categories. In two performance areas, effective processor speed and video performance, HP's Apollo 720 earns the highest marks.

7.5 Availability of development tools

SPARCstation IPC/IPX	7.9
HP Apollo 720	7.0
DECstation 5000 25	6.9
RS/6000 320H	6.6

7.4 Configurability

RS/6000 320H	7.5
SPARCstation IPC/IPX	7.5
HP Apollo 720	7.1
DECstation 5000 25	6.1

7.2 Expandability

SPARCstation IPC/IPX	7.7
RS/6000 320H	7.6
HP Apollo 720	6.9
DECstation 5000 25	6.5

8.0 Effective processor speed

HP Apollo 720	8.7
RS/6000 320H	8.4
DECstation 5000 25	7.3
SPARCstation IPC/IPX	7.2

7.5 Quality of documentation

SPARCstation IPC/IPX	7.1
DECstation 5000 25	7.0
HP Apollo 720	6.8
RS/6000 320H	6.4

7.3 Availability of applications

SPARCstation IPC/IPX	7.6
DECstation 5000 25	7.1
RS/6000 320H	6.7
HP Apollo 720	6.5

7.1 Effective video performance

HP Apollo 720	8.0
SPARCstation IPC/IPX	7.0
DECstation 5000 25	6.9
RS/6000 320H	6.9

7.9 Ease of use

SPARCstation IPC/IPX	7.7
DECstation 5000 25	7.6
RS/6000 320H	7.3
HP Apollo 720	7.2

7.4 Effective disk speed

RS/6000 320H	7.8
SPARCstation IPC/IPX	7.1
HP Apollo 720	7.0
DECstation 5000 25	6.8

7.3 Availability of upgrade options

SPARCstation IPC/IPX	7.5
RS/6000 320H	7.5
DECstation 5000 25	7.0
HP Apollo 720	6.4

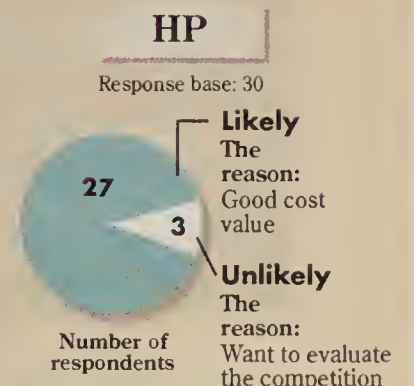
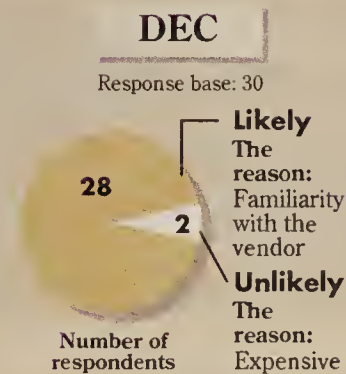
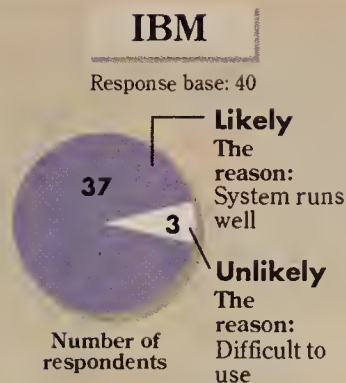
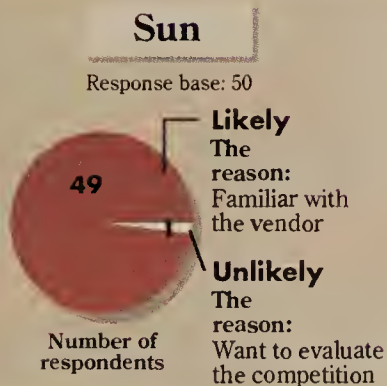
7.1 Ease of installation

SPARCstation IPC/IPX	7.6
DECstation 5000 25	7.6
HP Apollo 720	7.2
RS/6000 320H	7.2

Loyalties

Would you buy workstations from this vendor again?

(Reasons are based on most frequently stated responses)



Verbatim

What do you like best/least about this product?

(Responses are based on most frequently stated answer)

Sun SPARCstation IPC/IPX

Likes

Availability of software
Price performance
Flexibility

Dislikes

Poor performance
No flexibility
Too complex

IBM RS/6000 Model 320H

Likes

Fast processor
Vendor reputation
Flexibility

Dislikes

Poor operating system
No flexibility
Poor documentation

DEC DECstation 5000 Model 25

Likes

Fast processor
Price performance
Technical support and service

Dislikes

No flexibility
Poor performance
Lack of software

HP Apollo 720

Likes

Fast processor
Price performance
Graphics capability

Dislikes

Poor operating system
Lack of software
Too expensive

Vital statistics

Total number of respondents: 150

What is your position?

Director.....	17
Manager	64
Staff.....	45
Other.....	24

What is your responsibility for RISC workstations?

Evaluate or recommend vendors ...	130
Determine need	122
Select vendors.....	109
Approve or authorize purchase	60

For how many years have you been involved with RISC workstations?

Five or more years	43
3-4 years	47
1-2 years	40
Less than one year	19
No response	1

For which types of applications are you using this product?

CAD/CAM	53
Modeling and simulation	51
Other graphics-intensive work	49
Statistical analysis	40
Documentation	39

METHODOLOGY

Products in this Buyers' Scorecard are market share leaders among low-end, reduced instruction set computing (RISC)-based workstations.

User names were provided by nonvendor sources. The response base was 50 for Sun Microsystems, Inc.'s SPARCstation, 40 for IBM's RISC System/6000 and 30 each for Digital Equipment Corp.'s DECstation 5000 Model 25 and Hewlett-Packard Co.'s Apollo 720.

The total weighted scores were computed by multiplying the mean importance scores users assigned all criteria by the mean score each user group gave its own product. Ratings are presented in order of importance based on these mean importance ratings.

At the time these products were originally released, they were entry-level systems. The vendors have subsequently released new entry-level work-

stations at a lower price/performance point. For this reason, users were asked to rate the likelihood of their buying from the same vendor again — rather than the likelihood of their purchasing the same system model — for the Loyalties chart.

Most frequently named improvements users said they would like to see added to the workstations were greater CPU power, more expandability, more integrated system management and a broader selection of available applications.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and companies for their assistance in preparing this Buyers' Scorecard: Steve Widen, Workgroup Technologies, Inc.; Judith Hurwitz, Hurwitz Consulting Group; Andrew Allison, RISC Management Newsletter; Computer Intelligence/Infocorp.

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Return of the killer application?

*The next big hit probably won't be a single application
but a set of powerful support tools for users*

BY MARTIN L. ERNST

Return of the killer application — sounds like a B movie classic, doesn't it? Unfortunately, it's easier to come across a movie theatre playing pap these days than it is to find a broadly useful, new type of personal computer application that can transform the way users work.

While we may never again see a singular sensation on the order of word processing, spreadsheet, database or desktop publishing, the potential now exists for a set of applications that can have a major impact on how individual users gather and use information.

Best described as information flow control and processing support systems, these programs would bring together certain discrete PC subtasks that are typically scattered throughout the process of handling information. These include acquiring information, reviewing it, searching for and retrieving it, manipulating it, communicating it and diverting or discarding it.

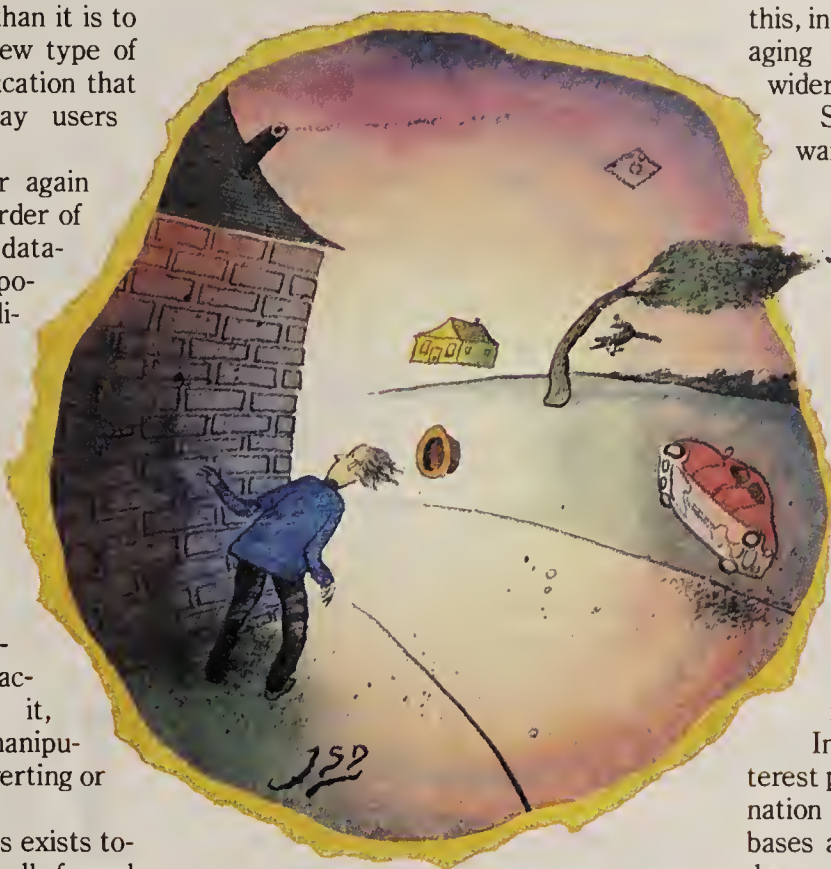
The basis for these applications exists today in certain PC products that handle formal search, manipulation and communications operations. However, today's offerings are in embryonic form and will need to be augmented by advances in areas in which PCs have had little or no impact: information acquisition and review and less formal modes of search and retrieval, such as general browsing.

Each program in this set would at first likely remain distinct, but there would be a consistent user interface among them, enabling users to pick and choose a program depending on the task at hand. In the future, these functions may become integrated into a separate utility or part of a PC operating system, a good location for seamless, data-level integration and consistent user interfaces across all pro-

Ernst guides research in electronic publishing as well as future business and work force requirements at the Program on Information Resources Policy at Harvard University in Cambridge, Mass. Prior to joining the program, he was vice president of advanced information technologies at Arthur D. Little, Inc.

grams available on a network.

When all is said and done, this new software will change the nature of the user-PC interaction, and the PC will become like a junior partner for users.



John S. Dykes

Currently, PCs operate under close and continuing human control. In the future, a major part of the PC's functioning might be spent in a quiet background mode, receiving

First of all, this vision depends on moving a lot more information from paper into electronic form as well as innovations in electronic displays. Flat-panel, book-size displays can make computers more acceptable devices for extensive reading activity, and this, in turn, could be a big factor for encouraging greater electronic distribution of a wider variety of text materials.

Secondly, we'll be considering software that does not yet exist in full-fledged form, so you'll need to use your imagination. We'll be emphasizing applications that might result from extending or combining existing programs. In terms of new applications, we'll concentrate on activities users are already doing and are familiar with, whether or not they now use some kind of automated assistance.

► Information acquisition control programs

There currently exist a few computer-based tools to help actively control the flow of incoming information.

In this category are some personal interest profile programs for selective dissemination from news wires and electronic databases and a variety of automated, full-text document indexing systems used for searching electronic databases.

However, today's products are limited in that they only filter information, removing data rather than improving the quality and variety of information received. Furthermore, they also require an intermediary, such as a librarian, for use.

To become an integral part of a cutting-edge information flow product set, personal interest profile programs must be put in users' hands. They must enhance their filtering of nonrelevant and redundant data and be able to increase the subject range of the acquired information of interest to users.

Take, for instance, a bank officer who is contemplating lending a construction firm money for a city office building. He knows he needs information on the firm's financials, but wouldn't it make his decision-making stronger if he automatically received information on subjects such as the city's vacancy rates? Such additional data would be valuable in assessing how risky the loan might be.

Continued on page 100

Hardware changes

The arrival of powerful information flow products may mean that PC hardware will need to employ somewhat new architectures.

For example, it might eventually make sense to design work-related PCs as two-processor systems. One of the processors would be general-

purpose, while the other would be designed explicitly for conducting fast and efficient search operations, mostly in background mode.

A precedent for this is the current coupling of general-purpose units with math coprocessors for conducting intensive calculations.

information from one or more sources and then processing it to make it more "digestible" (and, perhaps, more "tasty") for the human user.

For your consideration

There are a few things we must keep in mind as we describe the specific applications that will make up the information flow program set.

Continued from page 99

►Reviewing aids

The review process determines what will be done with information received. It can be a very brief decision ("throw it away" or "send it to Joe"), or it can involve detailed planning about matters such as what additional information should be gathered. Currently, there are no automated, user-controlled computer tools to assist users in this process.

What do exist are tools that make reviewing an easier task. Computer-prepared tables, graphics, color and exception reporting present the information in a pleasing format. However, these user-friendly formats don't provide users with the level of automated decision-making support they need during the review process.

One key to progress in this area is to pursue the underlying concepts of exception reporting beyond the purely arithmetic version now in use. Today's exception reporting, confined primarily to financial reports, alerts users (typically high-level managers) to such data as a sales figure below a certain percentage or expenses above a certain dollar amount. They do not deal with qualitative events.

Advanced versions of exception reporting will rely on checklists users establish that pinpoint more "soft" information they'd like to review. For example, they might need to be automatically alerted to any information dealing with actions a competitor is taking that may affect their work or company.

Another feature these review applications should include would be the ability, based on user input, to automatically prioritize incoming items for review. These applications should also support the review process by identifying, making available or referencing existing materi-

als that relate to items the user is reviewing.

Review applications, like all other programs in an advanced information flow product set, must be dynamic in the sense that they are under the individual user's direct control. That means they should be able to accept user feedback and, based on that feedback, automatically propose a variety of adjustments.

In this way, users would be able to exempt any items from the automated review process by subject, size or source. For example, a user would be able to signify that he wants to review all documents sent by his boss but not those sent by the head of building maintenance.

Some beginning work has been done in this area by Tom Malone, a professor at MIT who developed a system that can extract electronic-mail messages that match user-specified interests and then sort them by purpose or priority. A program based on these concepts, Beyond, Inc.'s Beyond Mail, came out in early 1991.

Companies will likely want to integrate some or all of the capabilities of the highly evolved review applications with those of the acquisition flow control programs to form a single product class.

►Search and retrieve programs

Search and retrieval is one area in which PCs have traditionally been strong. The key in this area is to improve what's available and the ability to use it.

Search and retrieval programs already have a major and growing role in rigorously defined searches and, to a lesser extent, fuzzily defined searches.

Many software applications incorporate a search mechanism for narrow and specialized purposes. Word processing

Nagging pains

There are two nontechnical barriers to the advent of information flow programs:

- Paper. It is hard to get computerized tools involved in information flow when so much of today's information exists in printed, rather than electronic, form.

- Intermediaries. A lot of information flow tools available today are operated by intermediaries, such as librarians. This arrangement turns off users because it adds cost and time to the information gathering process and limits the user's ability to keep customizing the process on the basis of his personal experience and preference.

packages, for example, need a search function to change or replace a word or phrase quickly and easily. In other applications, the object may be to rapidly locate specific files, data or other information from carefully structured information banks.

There are also systems available for full-text indexing and interactive search personified by major database services such as Lexis/Nexis and Dialog and replicable for PCs by Lotus Development Corp.'s Magellan, Zylab Corp.'s ZyIndex, AskSam Systems' AskSam and On Technology, Inc.'s On Location.

However, current computerized searching faces a variety of limitations, including the extent to which useful electronic databases are available in fields the user is interested in, the costs of building and/or accessing these databases and the need for most users to operate through a librarian or other intermediary because of the complexity of dealing with a variety of databases. This intermediary step increases costs, time and communications problems.

What are needed are more common search protocols across databases, increased development of internal databases, increased training in the use of databases and availability of more effective, low-cost scanners to enable users to transfer selected information from print to electronic format more easily. Where current software could use improvement is in the area of unstructured searches and searches for media other than text.

Free-form searching and retrieving, such as browsing or the "I can't tell you what I want, but I'll recognize it when I see it" search, would be greatly enabled if software could search and retrieve by association. This would require the development of different types of support and control tools, such as synonym and association dictionaries.

It would also require mechanisms to modify normal search procedures for par-

ticular purposes, automated aides to make it easier to test how well a given system is working and programs or sub-routines to handle analytical tools.

Associative techniques would expand the range of items in a user's information flow. However, associative searches require a great deal of computer power, a drawback that is holding this area back.

Search programs should be further broadened to ferret out relevant still pictures and video images in archival collections and libraries.

►Operations (data manipulation) programs

Operations capabilities are at the heart of computer activity — the primary source of its great strengths. This is where applications got started and where they continue to grow. Operations concentrate on activities such as data entry, correction, selection and transfer procedures; graphics/image creation techniques; and data analysis techniques.

The weak link in the operations area is in the lack of programs helping users to generally absorb and analyze information. Unfortunately, users need all the help they can get in this area; because of inadequate training on how to analyze information, many users are unable to perform strategically important analyses — namely, pattern identification (discerning the underlying meaning of a collection of data) and pattern creation (building new concepts or theories from data).

To help improve analysis of patterns and general-purpose information — from both in-house and external sources — tools are needed that simplify access, use and understanding (by less skilled users) of statistics and less quantitative analysis programs. Advances in the areas of data manipulation and list building are important.

Many business people can benefit from using statistical techniques but don't understand when to use which technique or whether a particular analysis is a valid one. This in turn limits their power of analysis — they don't know if they have made a strong

or weak conclusion.

What they require is a program that can question and check statistical techniques, suggesting new ones if needed. This may help avoid analysis mistakes based on the faulty use of statistics.

Improvements in list building concentrate on the management of lists. People build lists to learn and analyze a subject: what information is important, how it is characterized, how individual items on the list interact and so on. But such lists can become unmanageable. An easy-to-use program able to sort and structure these lists so they are easily accessed and cross-referenced will go a long way in helping decision-making.

Flexible graphics and sketch pad techniques, which provide users with the electronic equivalent of a personal chalkboard, can help front-end the analysis process. This chalkboard would enable users to show and alter information relationships and structures graphically. It would also aid thinking by association.

Continued on page 102

Parlez vous computer?

Users will need to grasp language to 'teach' computers

New types of information flow software can place new types of requirements on users. These requirements may change the skills needed for effective PC use, with users needing a greater grasp of language and more understanding of how they react to and process important data.

Today, users can get by with knowing how to command the computer to perform small unit operations, such as entering text, data, action codes or option choices or invoking broader instructions, such as performing a set of calculations or printing or saving a file.

In the future, the user will be required to be able to "teach" the machine — through words, short phrases and some simple parameters — how to identify (autonomously) materials of potential value to him and then organize and present them in specified ways. The computer would be "trained" (programmed) to replace human intervention in assessing the meaning and value of the substance contained in specific information.

To support this new *modus operandi* and the associated information flow software, a major portion of user instructions (that is, the various search

instructions) will require the effective use of an extensive vocabulary of "words" — symbols replete with multiple meanings and ambiguity and dependent on context.

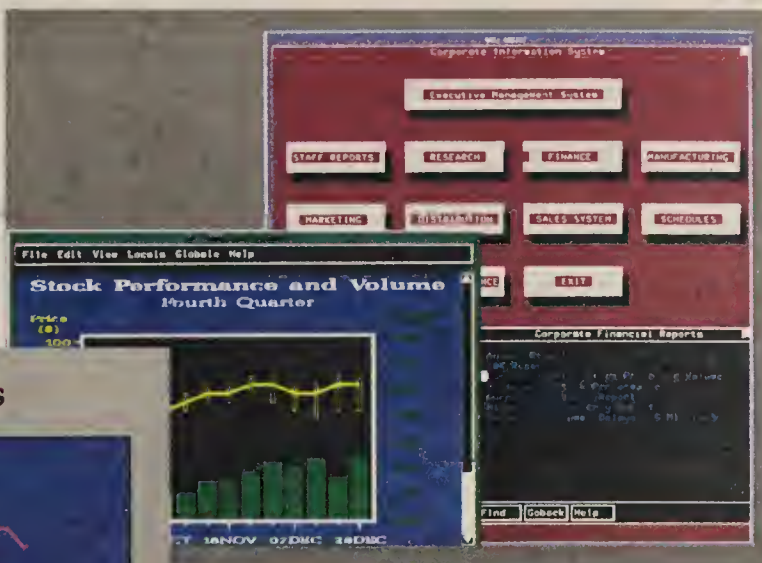
Success in interacting with computers will depend more on use of words and less on use of numbers, limited vocabulary and the algorithmic procedures that have dominated in the past.

To provide the needed training for their PCs, users must not only be knowledgeable about computers and programs but also have a deep understanding of language — its capabilities, limitations and local use. In effect, the language requirement is not far different from the definition of fully literate in a classical sense.

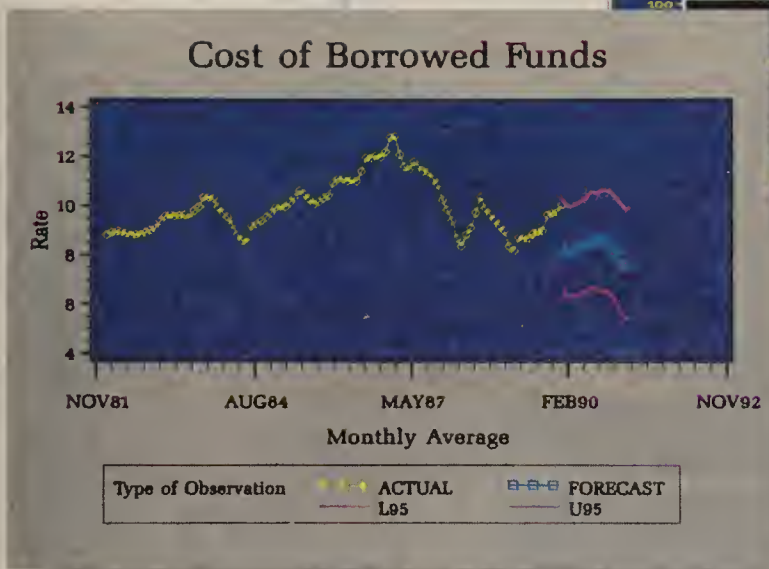
To gain the greatest benefit from information flow management, users must understand how they personally react to and process information. This analysis gives them a sense of what works best for them. What excites and stimulates them? How do they integrate bits of information? To what forms of presentation and from what sources do they respond best? This analysis is critical for teaching computers to perform to user specifications.

MARTIN L. ERNST

Executive



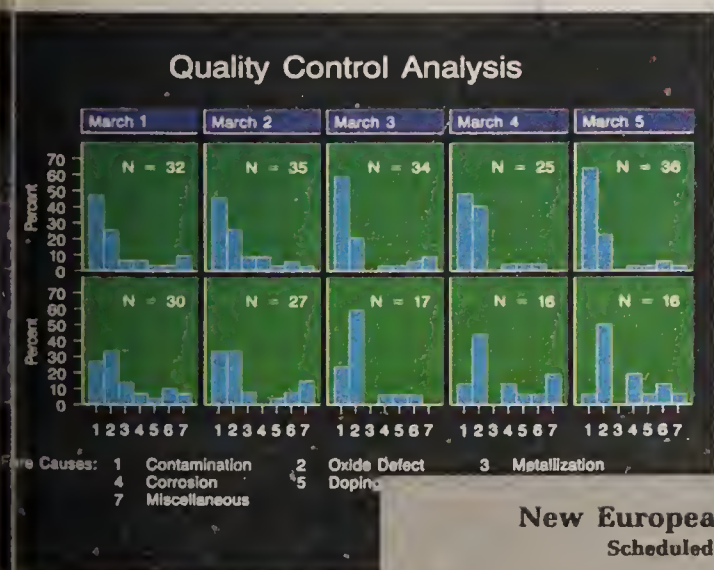
Finance



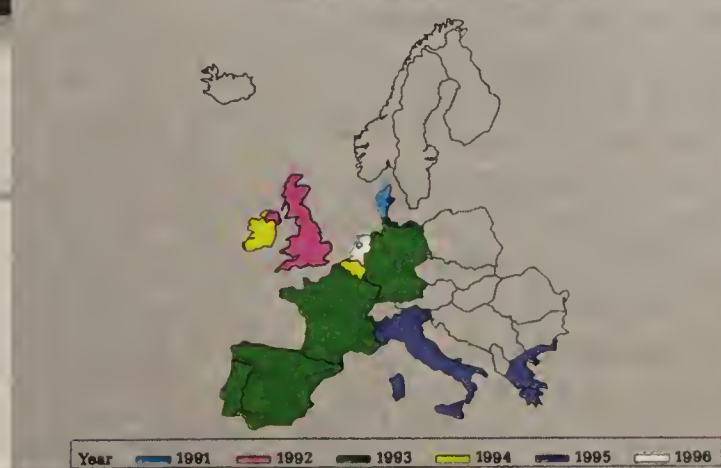
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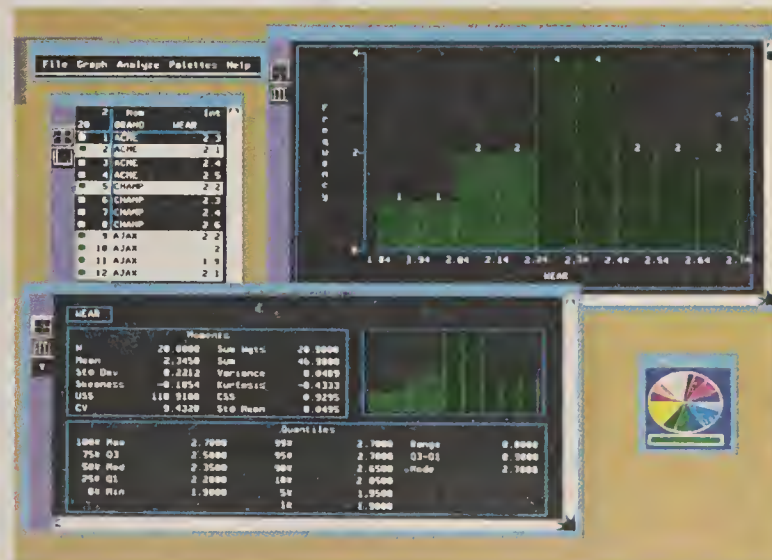
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Continued from page 100

Finally, in terms of preparing and maintaining analysis materials for later use, PC workers will need systems that can place all or portions of their materials (with proper references and attributions attached to data gathered from external sources) into personal work files.

For items being stored, these systems should also provide automated or semiautomated support for summarizing, indexing and personal characterization (memory hooks — e.g., "the report with the yellow cover" or "we received this the day the stock market crashed").

► Communications tools

An information flow product set is not complete without strides in the area of

communications — the preparation of information for passing on to others. No matter how advanced search and retrieval, reviewing and data analysis become, if those ideas cannot be shared among users, the process is a waste of time.

Software today is good at packaging information in text as well as image, graphics and number formats; that is, it is good at producing written output and support material for oral presentation. It will become even better in the future, as complex graphics, animation and the ability to zoom in on and perform three-dimensional rotations of materials becomes viable.

However, PC applications are lagging behind in the area of oral communication between one person and one or two others because such conversations are too

free-form. Support of informal conversing requires quick, unplanned access to documents and data.

In the long run, a big breakthrough needs to occur in the area of general speech recognition to help with informal communications. This would enable the machine to take instructions, access needed information and capture the conversation fluidly.

PC programs have made better progress in the area of structured, interactive group communications. There exists specially equipped group meeting rooms with connected machines and group software; however, these setups are still in the infant stages. The need to go into a separate room and use special equipment can have a jarring effect on users and may

hinder continuous information flow.

Perhaps the most important improvement will be in ease of use. In general, communications software must be simpler to use if PCs are to become more attractive to lightly trained people. These users should be able to get machines up and running with minimal training.

► Diverting and discarding applications

Discard and diversion activities do not normally require new forms of computer support, although deliberate destruction of computer records requires considerable user skills, especially as sophisticated automatic backup systems are developed. In fact, increases in storage capacity may actually decrease the need to discard material.

Where new programs are needed is in enabling the storing of information in a "semilimbo" state. This information would be accessible if or when business changes or interests make these items useful again, but the information would not clutter up currently used files in the meantime.

If all these pieces for advanced information flow programs fall into place, users will eventually have on their desktops what amounts to an automated personal assistant that can help them access pertinent information and use it in more productive, meaningful ways. •

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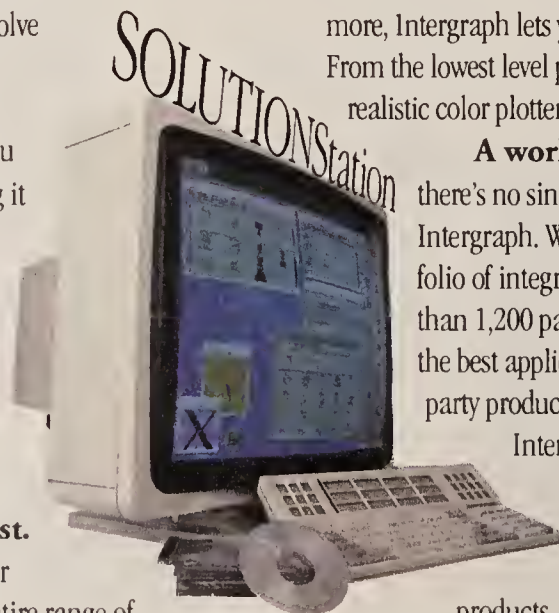
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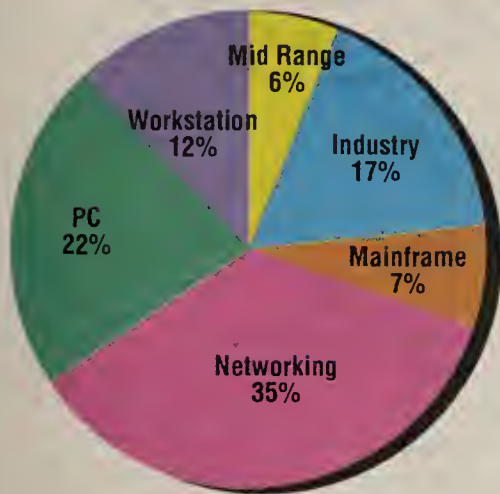
As users more readily search for, acquire and review external information, information publishers and providers (bulletin boards, interest group networks, commercial databases) and telecommunications firms will need to think about how they will charge for this access and line use. Here are some ideas on what might occur:

• **Traditional pricing scheme.** Publishers could offer lower prices for bulk acquisitions (including, in some cases, limited and specific redistribution rights).

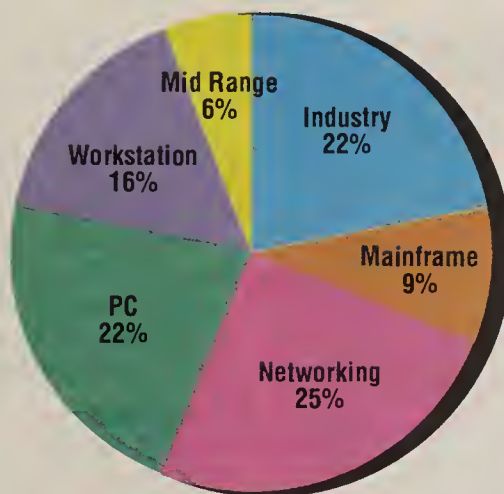
• **Scan charge.** Publishers and telecommunications firms could charge users a low fee for letting a computer scan an item to determine whether it is of interest and levy an additional charge if an actual acquisition is made thereafter. (In the future, when the PC can be trusted to select for acquisition desirable and relevant materials, this type of pricing might enable it to manage its own acquisitions budget.)

• **Trickle fee.** Telecommunications firms could institute extra-low charges for trickling information through to PCs (and other processing units) during periods of very low line usage, such as the early morning hours. Also, as in the case of information providers, transmission companies may benefit from a charging system that has a very low rate for exposure to an information item and a higher rate if the item is then acquired for further use.

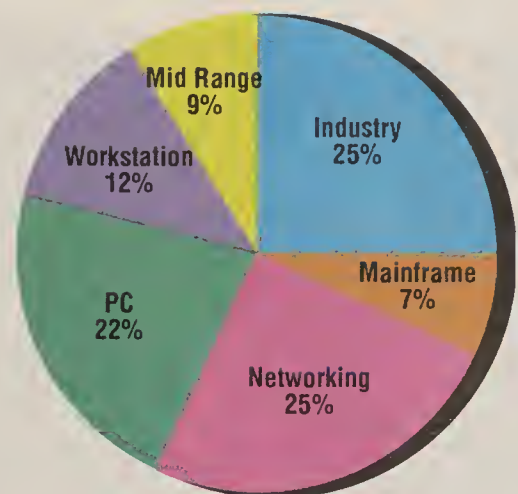
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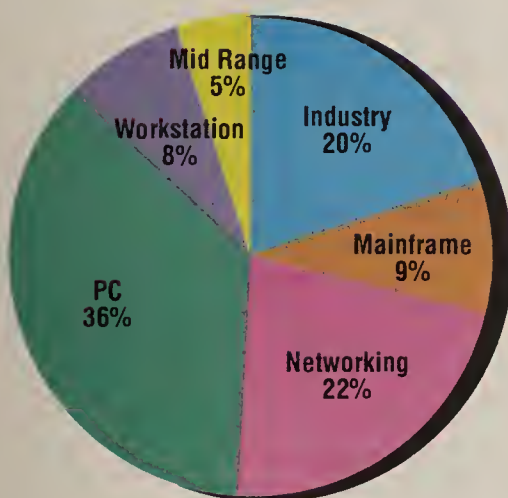
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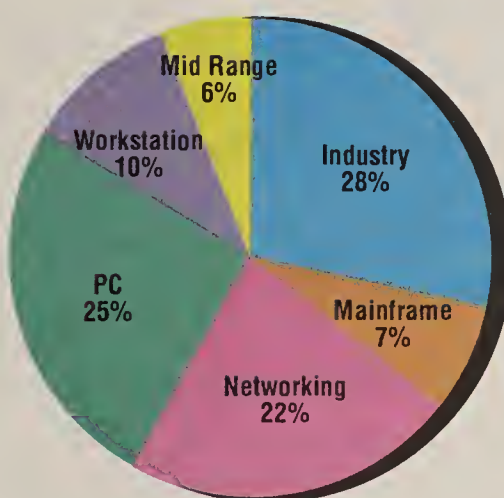
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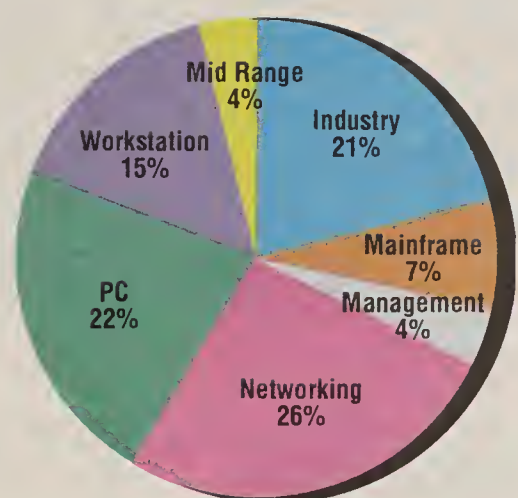
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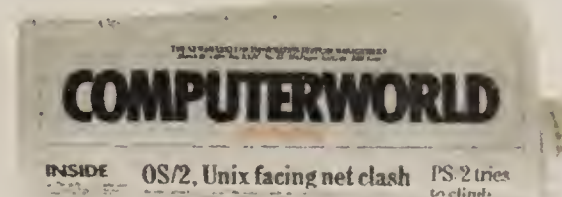
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The Newspaper of IS

Computerworld's I/S Brand Preference Study on Local Area Networks

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Best Documentation	IBM
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Ethernet Hubs

Best Technology	3Com
Best Price/Performance	3Com & Synoptics Communications
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Best Documentation	IBM
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Concentrators

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Best Price/Performance	Digital Equipment Corporation
Best Service/Support	Digital Equipment Corporation
Best Documentation	Digital Equipment Corporation
Prefer To Do Business With	Digital Equipment Corporation

Cabling Systems

Best Technology	AT&T
Best Price/Performance	AT&T
Best Service/Support	AT&T
Best Documentation	AT&T
Prefer To Do Business With	AT&T

Gateways

Best Technology	AT&T
Best Price/Performance	AT&T & Digital Communications Associates (DCA)
Best Service/Support	AT&T
Best Documentation	Attachmate & Digital Communications Associates (DCA)
Prefer To Do Business With	AT&T

Network Management

Best Technology	Digital Equipment Corporation
Best Price/Performance	Digital Equipment Corporation
Best Service/Support	Digital Equipment Corporation
Best Documentation	Digital Equipment Corporation
Prefer To Do Business With	Digital Equipment Corporation

Token Ring Hubs

Best Technology	Proteon
Best Price/Performance	Thomas-Conrad
Best Service/Support	Racal Datacom
Best Documentation	Proteon & Racal Datacom
Prefer To Do Business With	Proteon

Network Analyzers

Best Technology	Novell
Best Price/Performance	Novell
Best Service/Support	Novell
Best Documentation	Novell
Prefer To Do Business With	Novell

UPS

Best Technology	Best Power Technology
Best Price/Performance	Best Power Technology
Best Service/Support	Best Power Technology
Best Documentation	Best Power Technology
Prefer To Do Business With	Best Power Technology

Peer-to-Peer Operating System

Best Technology	Artisoft's Lantastic
Best Price/Performance	Artisoft's Lantastic
Best Service/Support	Artisoft's Lantastic & Tiara Computer Systems
Best Documentation	Artisoft's Lantastic
Prefer To Do Business With	Artisoft's Lantastic

Client/Server Operating System

Best Technology	Novell Network
Best Price/Performance	Novell Network
Best Service/Support	Novell Network
Best Documentation	Novell Network
Prefer To Do Business With	Novell Network

Terminal Emulation

Best Technology	IBM
Best Price/Performance	Novell
Best Service/Support	IBM
Best Documentation	IBM
Prefer To Do Business With	IBM

Backup Hardware/Software

Best Technology	Mountain Network Solutions
Best Price/Performance	Mountain Network Solutions
Best Service/Support	Mountain Network Solutions
Best Documentation	Mountain Network Solutions
Prefer To Do Business With	Mountain Network Solutions

Wireless LANs

Best Technology	Motorola
Best Price/Performance	NCR
Best Service/Support	Motorola & NCR
Best Documentation	Motorola
Prefer To Do Business With	Motorola

Electronic Mail/Groupware

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Best Price/Performance	Lotus/cc: Mail
Best Service/Support	Lotus/cc: Mail
Best Documentation	Lotus/cc: Mail
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COMPUTERWORLD

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IN BRIEF

Aerospace targets EDI

■ The Aerospace Industries Association will sponsor a conference on the implementation of electronic data interchange (EDI) and related technologies March 31 and April 1 in Long Beach, Calif.

Aerotech 2000 is the second of a series of regional conferences sponsored by the association to bring together major aerospace and defense companies and their suppliers to help accelerate the implementation of EDI by the industry. Information is available from Aerotech 2000 in Dallas at (214) 475-1838.

■ The 17th annual **Conference on Local Computer Networks** has issued a call for papers for its conference to be held Sept. 13-16 in Minneapolis. Cosponsored by the **IEEE Computer Society**, the event will emphasize practical experiences using local-area networks.

Session proposals should be submitted by April 7 to program chairman Steve Bell, Hughes LAN Systems, Mail Stop 392, 1072 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129. Phone number is (415) 966-7926.

■ The **Frost National Bank of San Antonio**, Texas, and **Local Federal Bank of Oklahoma City** have renewed their outsourcing contracts with **Systematics Financial Services, Inc.** Frost signed a five-year renewal of a deal started in 1989. Local Federal has been a Systematics client since 1984.

■ QUOTES OF NOTE:

"I have the energy now at 49 that I might not have at 55."
— Charles S. Feld, Frito-Lay, Inc. vice president of MIS, on his decision to start a consulting firm after 11 years with the company.

"The prevailing sentiment is, 'We're clearly going to a client/server environment, once we figure out what client/server is.'"

— Alan G. Hammersmith, A. T. Kearney, Inc. consultant, on a recent informal A. T. Kearney survey of chief information officers.

Giving downsizing the hard sell

Cobol veterans sold on learning C after Breuners trades mainframe for Unix system

BY JEAN S. BOZMAN
CW STAFF

When the Breuners Home Furniture chain declared Final Clearance — EVERYTHING MUST GO! — on its mainframe data center, it had to sell its Cobol programmers on all-new surroundings that would change their life-styles. For the most part, it has succeeded in making them as comfortable with C and Unix as they would be on a new sleeper-sofa.

Pleasant Hill, Calif.-based Breuners, which expects to unplug its IBM 4381 mainframe this summer, had to reshape the mission of its information systems staff during a conversion to C language-based Unix systems. It had to teach programmers new skills and train mainframe operators to do new jobs — but the selling was done largely on the basis of future marketability of newly acquired skills, not immediate monetary rewards.

"By and large, a Cobol programmer doesn't want anything to do with C," says John Longridge, vice president of management information services. "We had a selling job to [convince them] that this was the wave of the future, and once they got through it, they would be more valuable. That was the way we sold it: 'You learn it here, or you become dinosaurs somewhere else.'"

As Longridge began planning a three-phase conversion from the old system to the new, he had to persuade the 14 programmers on staff to learn entirely new computer languages. They had to abandon the well-known and comfortable world of Cobol for the



Robert Holmgren

Breuners' Longridge had to convince Cobol programmers that Unix is wave of the future

emerging world of C language, Microsoft Corp.'s Visual Basic, Unix and object-oriented programming.

And with enthusiasm from the firm's senior executives about the new technology, Longridge also had to manage their expectations about how quickly the system would come on-line.

"Downsizing doesn't come free," Longridge says. "It takes lots of time to do it. It's very important to have this vi-

sion and to sell everyone on it."

Longridge has appointed several project managers from user departments to oversee the development projects for downsized applications, earning praise from Breuners' youthful senior management team of President Stephen Wong and his brother, Chief Executive Officer Dennis Wong.

"It hasn't just been a bunch of MIS
Continued on page 106

Drucker: Words from a management sage

BY CLINTON WILDER
CW STAFF

Chief information officers need to live up to their name and turn their attention from the computing infrastructure to the company's information needs. That was the exhortation of veteran management thinker Peter F. Drucker, professor at the Claremont Graduate School of Business, to more than 500 attendees at the recent *CIO* magazine conference in San Diego.

Among Drucker's insights on information systems, management and quality were the following:

► **On executive suite acceptance of the CIO:** "These things go in stages, and you are just the latest profession to go through it. There was a time when you had to stroke the brow of the financial person. If you live long enough, there will be another one."

► **On focusing outside company**

walls: "There has never been a more important time for management to have outside information, yet your information model doesn't have it. Without delivering what the business needs from the outside, you'll end up like the most efficient producer of buggy whips."

"A GREAT MANY management layers don't manage; they are just relays. Every relay doubles the noise and halves the information."

► **On the CIO's responsibility to re-engineer, not just automate:** "In many hospitals today, 80% of the nurses' time is spent in serving the computer, not using their professional

training to care for patients. You automated their jobs, but you didn't say they would need a floor clerk. That is your job, and you didn't do it."

► **On organizational communication barriers:** "A great many management layers don't manage; they are just relays. Every relay doubles the noise and halves the information."

► **On IS management in Japan:** "We have to bring people into IS who understand the business. The only people who do this are the Japanese. They can get across to the IS people how they are restructuring a plant or a marketing plan."

► **On IBM's future:** "No one in IBM's position has ever been able to survive without going through 10 years of difficult times — but I never saw a big monopolistic company move as fast as IBM has. The next 10 years will be rough. If any of you are offered the IBM CEO job, make sure you have a very good severance deal."

Giving downsizing the hard sell

CONTINUED FROM PAGE 105

people working in a vacuum," Stephen Wong says. "We've had very strong user involvement. It's been a good balance between MIS efficiency and user input."

Breuners had to re-engineer all its primary mainframe Cobol applications, re-writing them for an open systems environment. The firm invested an average of \$1,000 to \$2,000 per programmer in re-training, according to Longridge.

"I was amazed that more people didn't leave," says consultant Larry S. Goldfarb, chief operating officer of GW Consulting, Inc., a San Francisco firm that assigns independent programmers to work on custom software projects. "Almost all of them saw the handwriting on the wall and went for the training," he adds.

Many remained

Just a handful of the 47-member IS staff left Breuners, including a database administrator who had worked with IBM's DB2 mainframe database. Now, more than a year into the conversion, the IS staff is down to 32, partly because some of the retrained programmers were able to take jobs at other firms.

Many of those remaining on staff had to learn to manage personal computers and local-area networks for the very first time. Among them were computer operators who formerly worked on the data center's third shift, which was eliminated.

When Breuners turns off its 4381, it will end more than 15 years of mainframe-powered data processing. The \$120 million chain of 20 stores in California, Arizona and Nevada will instead count on client/server computing to grow its business and save operating costs in the 1990s. The migration to two small Unix file servers from Hewlett-Packard Co. began two years ago.

Unlike many other firms that have tried downsizing, Breuners decided to re-write its applications rather than buying new ones off-the-shelf.

Key to the conversion's success was the commitment of Stephen and Dennis Wong, both recent Harvard Business School graduates, to PCs and client/server technology. They believed in the value of client/server technology, despite the up-front costs of replacing all IBM terminals with PCs and installing new LANs.

"We never intended to become passive investors," Stephen Wong says. "We knew we would have to get involved, and

that systems was one of the areas we had to target. Many businesses look at MIS as overhead, but we look at it as being very competitive because it lowers costs and provides more information."

Stephen Wong became president of Breuners in May 1990, when Prism Capital Corp. bought the chain from BATUS, part of British conglomerate BAT PLC. "The old mainframe system became dysfunctional over time because it evolved into a patchwork of code," he says. "Fifteen years after it was installed, the system was determining how the business was run, rather than the other way around."

Software maintenance was eating up a large part of Breuners' IS budget, Longridge says. "For the amount we spend in

one month for IBM software rental, we can have a year's worth of maintenance on the HP-UX operating system and the databases," he says. "There has been a 70% savings in software and hardware maintenance alone."

By moving to smaller and more flexible Unix systems, Breuners hopes to create applications that will expedite inventory searches and reduce data entry errors. Until recently, errors from the outdated point-of-sale terminals had reached 15%.

The speed of Breuners' shift into downsizing has stunned some observers. "Most other downsizing sites will start with the client applications and maybe a server for electronic mail," Goldfarb says. "Breuners took a big leap into the swimming pool. They did it all at once."

Bye, IBM

The key elements of Breuners' new client/server environment are two HP 9000 Model 750 servers that run the HP-UX Unix operating system and the Sybase, Inc. relational database management system. Both servers, which operate at 76 million instructions per second, fit under a desk and occupy just a fraction of the space taken up by the IBM 4381 mainframe and its multiple disk drive units.

The new systems will move to Breuners' headquarters in Pleasant Hill, Calif., by year's end, and the mainframe data center in San Ramon, Calif., will be shut down. By 1993, the most visible change at Breuners will be the absence of the IBM mainframe, along with the IBM field engineers.

"You can't beat IBM support," says John Longridge, vice president of MIS. "You no longer have the luxury of calling one vendor on the phone and asking them to fix it. With client/server systems, you have to be much more technically capable to handle your own problems."

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CLIPS



Tim Lewis

Items of interest from publications, speeches, surveys and research projects

Food for thought

■ Some maxims on the management of technology devised by attendees at a recent Conference Board conference:

- "Companies that are in trouble have great strategies."
- "Technology, like love, knows no national boundaries."
- "The value of technology depends on context."
- "Good technology will only make bad management work."
- "ROI on R&D is ITD (impossible to determine)."
- "Good technology is like pornography — you know it when you see it."

Source: "Getting Maximum Business Value from Technology," *The Conference Board, Inc.*, New York, March 10-11, 1992.

Getting an edge

■ There is nothing the matter with U.S. workers, according to former Secretary of Labor William E. Brock, currently a member of President Bush's Education Policy Advisory Committee. What is holding this country back is poor training and management, he says.

"Most workers want to work and be proud of what they do. The Japanese run plants in this country that are just as productive as their counterparts back in Japan. They are using American workers, so it's not an employee problem. The question is how that worker is trained and managed."

Source: "A Washington Insider Debunks Politics as Usual," an interview by Larry Reynolds, *Management Review*, February 1992.

Changing values

■ American managers of today have a greater interest in values than they had 10 years ago, according to a 1991 survey of U.S. managers by the American Management Association. Priorities have shifted to emphasize quality and customer service ahead of effectiveness, productivity, morale, growth and even profits. Managers in 1991 value honesty and competence above all other qualities in the people they would be willing to follow. Other important characteristics were broadmindedness, dependability and forward thinking.

Source: "Values of American Managers: Then and Now," by Barry Z. Posner and William H. Schmidt, *HRfocus*, March 1992.

Diagonal thinking

■ In the 1990s, successful chief information officers will be those who support communication without regard to boundaries; who think about the organization horizontally and diagonally rather than in simple up and down terms; and those who make it a priority to find ways to support partnerships and alliances. "Think multifunctional, not functional; think spiderwebs of communication, not protective fiefdoms; and think with unrestricted boundaries."

Source: "Prescription for Failure: A '70s IS for a '90s Organization," by Kenneth A. Kozar, Chief Information Officer Journal, Winter 1992.

Liberal hiring

■ Rather than hiring information systems majors for computer maintenance, personnel expert Robert A. Zawacki suggests tapping liberal arts graduates for this task.

The reason: IS majors are more interested in systems development. Liberal arts graduates can easily be trained to perform maintenance and are usually more satisfied with the job.

Source: "Motivating the IS People of the Future," by Robert A. Zawacki, *Information Systems Management*, Spring 1992.

Teams take time

■ If you are trying to implement cross-functional teams, be patient, advises Deborah G. Ancona, research management professor at MIT.

"Cross-functional teams don't do as well as other kinds of teams in the early stages, but let them learn and they'll come up the learning curve — provided the culture, the rewards and the training are in place."

Source: "Management Must Make Teamwork Work," research by management professors Deborah G. Ancona, MIT, and David F. Caldwell, Santa Clara (Calif.) University, CIMS Technology Management Report, Winter 1991-1992.

Compiled by Kelly E. Dwyer, assistant editor, features.

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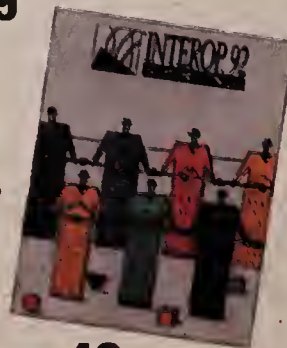
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COMPUTER CAREERS

Mapping your future starts with research, skills models

BY GARY ROBINS
SPECIAL TO CW

Getting ahead in your career may be difficult unless you know where to start — what skills, courses and extracurricular activities are important in your company for advancement.

A good way to get all this information in one place, information systems managers agree, is to put together a complete skills assessment — one in which you list your skills and background and rate your degree of competency in a variety of areas. This list of strengths and weaknesses serves as a basis to map out future learning plans.

At Humana, Inc., a large health care provider in Louisville, Ky., for example, an Education Profile Database containing training history and skills needs was developed to help guide employees. "When a new person comes on board," says Fred Gup-ton, director of IS development education at Humana, "one of the things we ask for is an initial inventory of their skills."

One way to determine the

skills you'll need in the future is to pick a job to which you aspire and find the official job description that documents the necessary skills.

San Ramon, Calif.-based Pacific Bell's Systems Technology Curriculum describes 34 jobs in 13 job categories. For each job description, there is not only a listing of skills required but an explanation of the courses available to supply employees with those skills.

To help IS employees determine what skills should be targeted, many corporations have formalized requirements in a skills model. Some models comprise more than 100 skills.

Beyond techie know-how

While skills such as knowledge of information engineering or systems re-engineering are often grouped under a "technical" component in corporate skills models, the models also have nontechnical components, including supervisory skills, knowledge of the business and interpersonal/communication skills.

Leaning toward the technical skills without addressing the non-

technical areas "is a mistake," says Steve Derry, manager of technical support at Chicago's Borg Warner Corp.

Supervisory skills, for example, come into play because at some point in the IS professional's career, there will be a need to decide whether the management track is appealing. Most corporations will evaluate



Janell Genovese

employees on a management or supervisory component even if they are only working with one or two other employees.

If the staff member chooses a management path, strong writing, verbal and leadership skills are emphasized to ensure smooth communication with team members.

If you decide you want to stay

with your present company, then learning more about its business is a key concern, says Tina Rankin, president of Valley Micro Associates, Inc., a Minneapolis-based firm that specializes in training technical support personnel. This will help you determine what kind of skills the company will be looking for in the future to meet its strategic objective. Then you can more easily assess how well you are prepared to help the company achieve its goals, she says.

Lee Whitcraft, director of operations for Technology and Information Education Services, a cooperative of 51 Minnesota school districts that is based in Roseville, Minn., and president of the Northwest chapter of the Data Processing Management Association, notes that professional data processing associations have been leaning toward addressing the nontechnical issues.

"A person has to be technically competent, but they have to be able to communicate. They have to be able to listen to what people are saying to facilitate that process," he says.

The appreciation of communication skills by management naturally extends to any area where there is customer contact. "In the employee's thinking, the

technical comes first by far. In the employer's view, it probably goes 51% toward effective communications and 49% toward technical skills development," says Alan Paller, who directs professional development for the field technical area at Computer Associates International, Inc. in Garden City, N.Y.

Knowing what to ask

The scale tips in favor of communication because the success of a project, in many cases, depends on technicians being skilled at asking the right questions and listening carefully.

Educators and data processing trainers are clear on one thing: training and learning are different. Training tends to be a short transfer of data while learning is an ongoing process. What IS professionals should do is look for learning opportunities rather than just pick training courses out of a catalog.

"Training is just a small part of the learning process," observes Rouja Brzozowski, an independent consultant based in New York who specializes in developing corporate IS skills models. "Opportunity to practice and opportunity to see how it can be applied is as important, so people need to seek out learning opportunities much more than training opportunities."

Robins is a free-lance writer based in Northfield, Minn.

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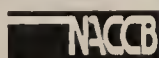
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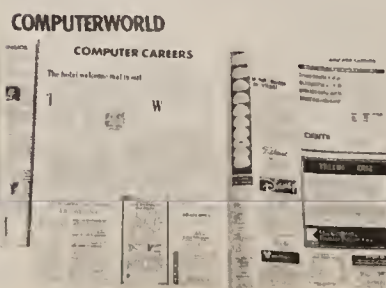
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Fast Track is a twice-monthly column dedicated to answering questions on career directions. This week's guest advisers are Pam Summers, vice president and MIS specialist, and Jack Ferrara, senior data processing consultant. Both work as The Career Doctors at Russoli Associates, Inc. in Allentown, Pa.

Q I've been a contract programmer for the last five years. I've worked in a variety of jobs covering a wide range of computer technologies, and I've also done some customer service and sales.

I'd like to settle down with a full-time job at a large company. However, my resume is a laundry list of a dozen or so jobs that have little in common. How can I present myself as someone with a cohesive background?

A Present your resume in such a way that you don't come across as a "what should I be when I grow up?" type. You need to find a good employment consultant who can help you develop a marketing strategy. However, real-market value versus inflated consulting per diem value will probably mean going several steps backward in earnings the first year or so.

Q Does an employer/manager have an obligation to push people to learn new skills if they say they aren't interested (e.g., a batch programmer who is reluctant to learn on-line techniques)?

A Encouraging employees seems to be more apt to work than "pushing" them. I know of one instance where a manager pushed an operator into a pro-

gramming position — for his own good. Unfortunately, the operator did not want to program and called us to get him out of that company and place him as an operator elsewhere. As that example illustrates, this kind of decision should be discussed at great length by both parties.

However, you should be happy to have a manager looking out for you. We very rarely get search assignments for "dinosaurs," such as batch/Cobol/vanilla programmers.

FAST TRACK CAREER ADVICE FOR THE '90s

Q I am a programmer/analyst with eight years of experience whose career has evolved into the "technical service" aspect of the Application System/400. My current duties have very little to do with application programming and concentrate more on system software management, communications and connectivity, programmer support and capacity planning.

I would like to expand into management or the technical service area. What should my next step be?

A You could choose one of two paths: Path A is a technical services route; Path B, an applications and development route. Both paths lead to management. We don't deal with Path A that of-

ten. On path B, we suggest trying a project-leadership half technical/half administrative post to see if you really want management. In the AS/400 world, staying technical means staying marketable. Don't paint yourself into a nontechnical corner.

Q I am a specialist in communications working at a Canadian subsidiary of a large German company that also has a big U.S. operation.

I've been working in information systems for 10 years (three of those with my current employer), hold a bachelor's degree in electronics and communications and have done postgraduate studies in telecommunications.

I want to work with our sister company in the U.S. Do you think I could have problems getting a U.S. working permit because I am not a Canadian citizen?

A If your sister firm has a technical position you are qualified for and an internal transfer, promote-from-within policy, you should get serious consideration. Your current association with the firm and a clean citizenship background check can help you. The sister firm may have to write a job description that could only be filled by you, though.

We want to hear from you. Please direct your career questions to Kelly Dwyer, Careers Fast Track, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. If we use your question, we'll send you a gift.

TIP of the MONTH

How to tell an employee that his skills are outdated



Be discreet. Ask the employee questions about areas where his skills are weak and allow him to realize he needs to strengthen his skill set. Also, assign the employee to a project that will force him to learn new skills.

*Brian Jaffe, manager
End-User Services
Clairol, Inc., New York*

Employees may cling to outdated skills, so direct comment could be perceived as an insult. Instead, clip relevant articles and pass them on with an "FYI" note to the person who needs to get up to speed.

*Robert Voltz, MIS director
Rieke Corp., Auburn, Ind.*

There's no reason for information systems professionals to become obsolete. We all have a responsibility to manage our own careers by reading industry publications, investing in training and being sensitive to new directions in the industry.

*Robert M. Goldberg, vice president, IS Group
Old Stone Bank, Warwick, R.I.*



Performance review meetings throughout the year provide the perfect opportunity for discussing how employee skill sets match the company's needs. Work with employees to develop training schedules and build training expenses into the budget. The company should be supportive of people who want to stay current because they add value to the organization.

*John A. Clark, assistant director, LAN Support
Cigna Corp., Philadelphia*



Responsible managers can't let employees go on very long with outdated skills. Explain to the employee where he needs to brush up and then provide training to help him learn.

*W. Ralph Butler, director of campus IS
David Lipscomb University
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Compiled by Jill Vitiello, a free-lance writer in East Brunswick, N.J.

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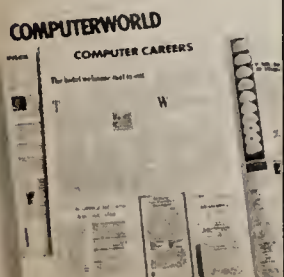
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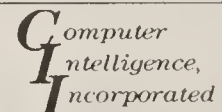


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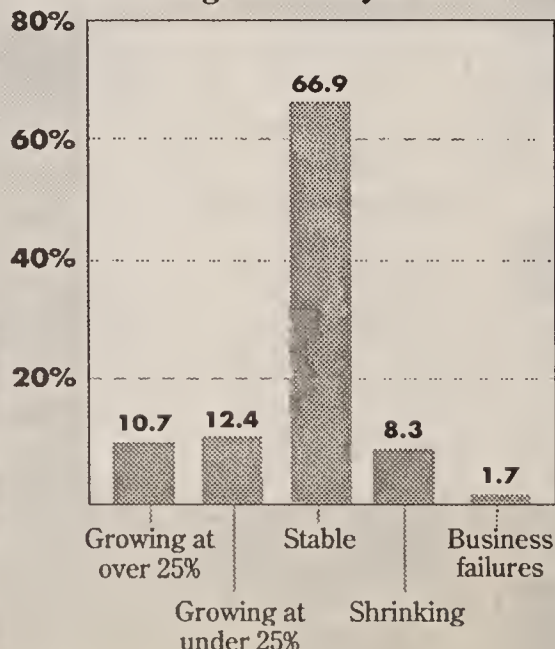
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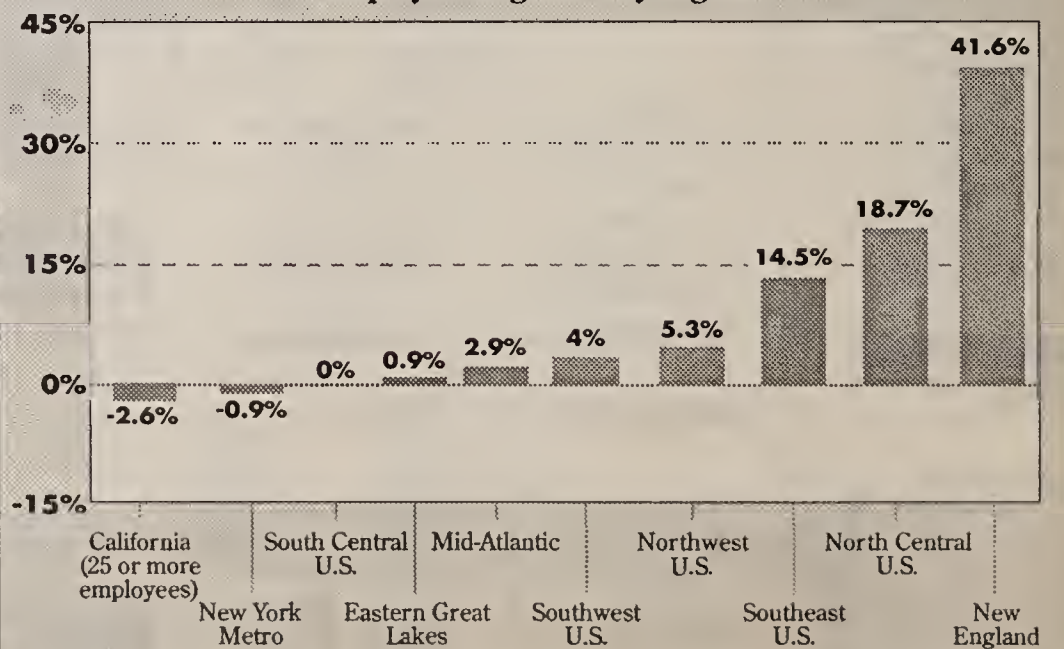
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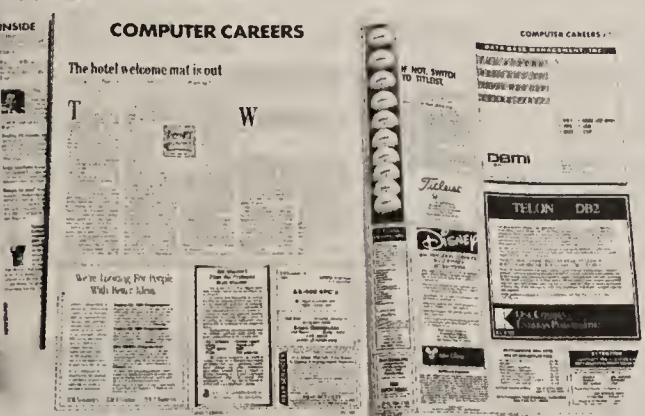


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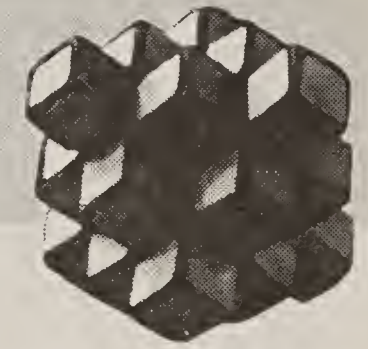
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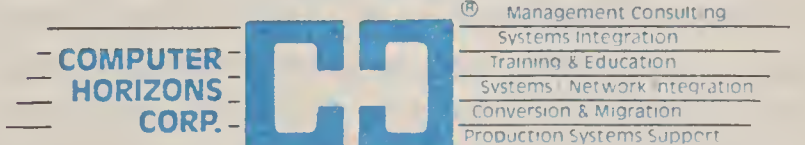
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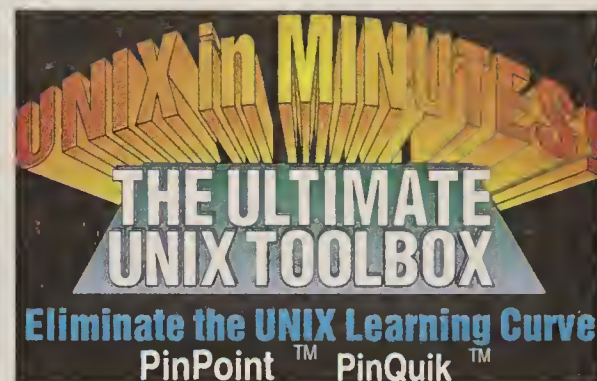
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The better number cruncher

Business modeling software can be a welcome alternative to spreadsheets

BY ALICE LAPLANTE
SPECIAL TO CW

Some people use personal computer spreadsheets for every type of business problem involving number crunching.

But spreadsheets can't always do it all. Problems can occur when you use them for more complex business modeling and financial analyses: They can get overloaded and unwieldy and start eating into system resources. Moreover, they lack the flexibility required by many business users and can be almost impossible to share if too complex.

That's why some firms turn to business modeling software.

"A good user can do virtually anything in a spreadsheet," says Gregory Konneker, a systems engineer at Kraft General Foods, Inc. in White Plains, N.Y. However, he adds, "Isn't it more efficient to use a business modeling package where much of the sophisticated equations and functions are already built-in?"

All in one

Business modeling is a specialized niche of PC software that combines spreadsheet, database and statistical analysis functions.

Companies can use the equations and macros that are built into these packages to forecast

sales, create balance sheets, calculate cash flow, evaluate investment opportunities and perform other complex analyses without having to start from scratch with a row of blank spreadsheet cells.

The real strength of a business modeling software package is its multidimensionality, Konneker says. That means data is not limited by a certain setup of rows and columns but rather can

Low-end packages are little more than spreadsheets preconfigured for routine financial analyses. These are off-the-shelf products containing the most common financial equations.

The real power is in the mid-range to high-end products, which allow data to be imported from different sources and also build models to handle most corporate financial needs.

Things to look for:

- Built-in financial ratios or processes important to the organization.
- Easy-to-understand commands.
- Self-documenting models.
- Import and export functions.
- Adequate training and support services.

CW Chart: Michael Siggins

be sliced and cut into different perspectives without rekeying or reprogramming the entire model. This distinguishes the low-end products from high-end ones and is "something that most spreadsheets don't provide," he adds.

Ranging in price from \$200 to more than \$5,000, there are approximately two dozen PC-based modeling packages suitable for large company use.

Best candidates

Leading midrange products include One Up, Javelin Plus and Encore Plus. High-end products that have migrated into the mid-range price category include Value Planner and CA-Compete 4.2 (see chart at right).

Such products often have special debugging utilities, use simple commands that enable models to be used easily and can be integrated into an organization's accounting, marketing and strategic planning functions.

When shopping for business modeling software, it's important to look for a self-documenting capability, meaning that the commands are in clear language and the process of building a model is structured so that anyone using it can understand the underlying assumptions and functions.

"A model must be able to be easily passed on from one generation of employees to another,"

says Chris Kinsey, manager of technology development at GE Capital Monogram Retailer Credit Services, Inc. in Miriam, Kan., which uses One Up.

Business modeling software has a reputation for being extremely difficult to use — some are significantly harder than others — but the benefits are worth the aggravation, users say.

Arthur Coleman, a Javelin Plus user who is responsible for the local-area network at Bechtel Financing Services in San Francisco, says it takes half the time (about six months) to train analysts on Javelin Plus than on their previous mainframe-based product.

Harvey Huffman, vice president of Wachovia Bank in Winston-Salem, N.C., also agrees, saying Encore Plus was much easier to learn than traditional computer or spreadsheet macro languages. It's also "easily worth several times its cost in terms of power and functionality," compared with the \$60,000 to \$80,000 mainframe products he has used.

Ease of use and increased processing power won't be beneficial, however, if the software can't import and export the needed data residing on other systems or in applications. Fortunately, these capabilities are becoming a standard, says Harry

A product sampler

Value Planner (\$4,700)
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CA-Compete 4.2 (\$995)
Computer Associates
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Garden City, N.Y.

One Up (\$1,500)
Comshare, Inc.
Ann Arbor, Mich.

Encore Plus (\$895)
Ferox Microsystems, Inc.
Alexandria, Va.

Javelin Plus (\$695)
Information Resources, Inc.
Waltham, Mass.

CW Chart: Michael Siggins

Williams, manager of business planning for reprographics marketing at Xerox Corp.

"You may want to pull data down from Oracle databases or from a source that has its data listed in a certain format," says Williams, whose firm uses CA-Compete. But without importing and exporting, "you'd end up rekeying data by hand."

Lastly, crucial debugging features — sufficient utilities to test and find problems in a completed model — are not included in all business modeling software. When a firm is making million dollar decisions based on an analysis, Coleman says, "it's essential for it to be right."

LaPlante is a free-lance writer based in Palo Alto, Calif.

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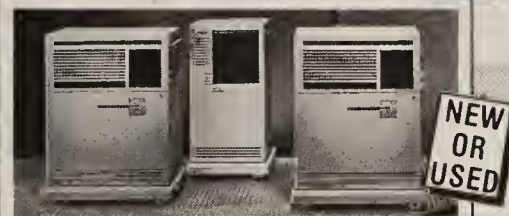
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PS/2 Model 90	\$4,300	\$4,600	\$3,300
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Portable 386	\$2,000	\$2,125	\$1,000
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Deskpro 286E	\$600	\$1,000	\$325
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Computerworld Friday Stock Ticker

STOCK TRADING INDEX



Industry Almanac

NEW COVERAGE

INITIAL RATING OF STRONG BUY: Zitel Corp. (Kemper Securities Group, Inc.). Zitel (ZITL) is an innovative data storage company specializing in solid-state memory products.

The storage market is embarking on a significant growth trend, and Zitel should benefit. The company sells to both OEMs and end users. **Unisys Corp.** (UIS) is Zitel's biggest end-user customer. In April 1990, the two firms signed a cooperative marketing agreement whereby they will jointly sell Zitel's solid-state disks in the U.S. and Western Europe, and Unisys will sell them in the rest of the world.

Although Unisys' installed base has been a big market for Zitel, management wants to enlarge its realm. Expect to see platform diversification sometime this year.

RECOMMENDATION CHANGES

UPGRADED FROM HOLD TO BUY: Novell, Inc. (UBS Securities, Inc.). As a result of stock price drops, Novell (NOVL) is now a worthy buy. The company's most recently reported quarter was 10% stronger than anticipated, and it looks like Novell's growth will outpace even that of **Microsoft Corp.** (MSFT) in the near term.

Revenue from the IBM contract should pick up during the next few quarters. Similarly, deals with **Hewlett-Packard Co.** (HWP), **Digital Equipment Corp.** (DEC) and **Unix System Laboratories, Inc.** should further improve Novell's bottom line.

DOWNGRADED FROM BUY TO NEUTRAL: Chips and Technologies, Inc. (Shearson Lehman Brothers, Inc.). The Intel Corp. (INTC) lawsuit creates an extra element of risk for investors thinking of buying Chips and Technologies (CHPS). While a suit from Intel has always been a possibility, the filing has occurred just as Chips and Technologies is getting ready to ramp up marketing of its microprocessor family. Also, one of the company's top managers, Chief Operating Officer Keith Lobo, has suddenly resigned.

Prospects for near-term stock performance look poor. Let the dust settle on the lawsuit and management changes before considering purchase.

KIM S. NASH

CLOSING PRICES FRIDAY, MARCH 20, 1992

TOP PERCENT GAINERS

Data Switch Corp.	25.00
Gandalf Technologies Inc.	19.47
Newbridge Networks Corp. (H)	18.02
Goal Systems Int'l	18.00
Informix Corp. (H)	17.79
Dell Computer Corp. (H)	14.79
Software Toolworks Inc.	14.58
IPL Systems Inc. (H)	11.86

TOP PERCENT LOSERS

Meca Software	-22.45
Go Video (H)	-16.67
Struct. Dynamics Research	-13.10
Cognos Inc.	-11.54
Evans & Sutherland	-8.45
Printronic Inc.	-8.33
Iomega Corp. (H)	-8.22
Network General	-7.87

TOP DOLLAR GAINERS

Microsoft Corp.*	7.50
Dell Computer Corp. (H)	5.25
Hewlett-Packard Co.* (H)	5.00
Informix Corp. (H)	4.63
Cisco Systems Inc. (H)	3.63
Matsushita Electronics (L)	3.50
IPL Systems Inc. (H)	3.50
ITT Corp. (H)	2.88

TOP DOLLAR LOSERS

Computer Sciences* (H)	-5.63
IBM*	-3.25
Digital Equipment Corp.*	-3.13
Struct. Dynamics Research	-2.75
Cabletron Systems (H)	-2.13
Sun Microsystems Inc.*	-2.13
Network General	-1.75
Aldus Corp. (L)	-1.75

Exch 52-Week Range

March 20 Close Wk Net Change Wk Pct Change

Communications and Network Services Up 1.84%

OTC	15.00	6.75	3 COM Corp.* (H)	12.63	-0.88	-6.48
NYS	68.00	55.75	American Info Techs Corp.*	58.38	-0.88	-1.48
NYS	41.38	32.50	AT&T*	40.50	2.25	5.88
OTC	4.25	1.25	Artel Communication Corp.	2.50	0.00	0.00
NYS	52.75	41.75	Bell Atlantic Corp. (L)	42.25	-0.13	-0.29
NYS	54.13	44.50	Bellsouth Corp. (L)	44.50	-0.88	-1.93
NYS	9.38	4.75	Bolt, Beranek & Newman	6.63	0.25	3.92
NYS	65.88	30.25	Cabletron Systems (H)	56.00	-2.13	-3.66
OTC	31.00	11.75	Chipcom Corp.	26.00	-0.25	-0.95
OTC	87.25	21.00	Cisco Systems Inc. (H)	82.88	3.63	4.57
OTC	35.25	13.75	Compression Labs Inc.	26.38	1.25	4.98
OTC	4.75	1.50	Data Switch Corp.	2.50	0.50	25.00
NYS	23.63	12.38	Digital Comm. Assoc.*	22.00	0.88	4.14
OTC	21.50	8.50	Digital Systems Int'l Inc.	13.25	-0.88	-6.19
OTC	9.75	3.63	DSC Communications	5.63	0.56	11.10
OTC	12.38	5.00	Fibronix Int'l Inc.	7.50	0.00	0.00
OTC	36.25	11.75	FileNet Corp. (H)	34.88	0.88	2.57
OTC	3.75	1.13	Gandalf Technologies Inc.	2.69	0.44	19.47
OTC	2.69	1.19	Gateway Communications	1.56	-0.06	-3.82
NYS	5.25	2.13	General Datacomm Inds. (H)	5.13	0.50	10.81
ASE	5.88	0.50	Go Video (H)	3.75	-0.75	-16.67
NYS	35.00	28.13	GTE Corp.*	30.75	0.63	2.07
NYS	70.63	50.00	ITT Corp. (H)	66.25	2.88	4.54
OTC	36.13	25.25	MCI Communications Corp. (H)	34.25	1.50	4.58
OTC	14.50	5.00	Microcom Inc.	12.50	-0.50	-3.85
NYS	18.25	6.88	Network Equipment Tech.*	15.75	0.25	1.61
OTC	25.50	6.75	Network General	20.50	-1.75	-7.87
OTC	20.00	10.50	Network Systems Corp.	13.63	0.75	5.83
OTC	16.38	5.50	Newbridge Networks Corp. (H)	16.38	2.50	18.02
NYS	49.25	29.88	Northern Telecom Ltd.* (H)	46.00	-0.13	-0.27
OTC	65.00	22.63	Novell Inc.*	59.00	0.25	0.43
NYS	82.38	68.00	Nynex Corp.*	71.75	-0.88	-1.20
OTC	37.50	16.50	Otel Communications Corp. (H)	34.25	0.50	1.48
OTC	11.63	5.63	Penril Data Comm. Ntwks.	7.63	-0.13	-1.61
OTC	53.00	19.75	Picturatel Corp. (H)	45.75	-1.25	-2.66
OTC	18.75	9.75	Proton Inc. (H)	15.00	-0.75	-4.76
NYS	19.75	11.63	Scientific Atlanta Inc. (H)	17.75	0.38	2.16
NYS	66.00	49.00	Southwestern Bell Corp.	58.75	0.50	0.86
OTC	47.00	14.25	Synoptics Communications	23.50	0.50	2.17
NYS	31.50	21.00	United Telecom (L)	21.88	0.00	0.00
NYS	40.00	33.38	US West Inc. (L)	33.88	-1.00	-2.87
OTC	41.25	21.25	Wellfleet Communications	38.13	2.75	7.77

PC / Workstations

Up 2.44%

OTC	20.75	6.50	Advanced Logic Research (L)	7.50	0.00	0.00
OTC	3.63	1.50	Alpha Microsystems	0.00	0.13	5.56
OTC	73.25	40.25	Apple Computer Inc.*	63.25	0.13	0.20
OTC	32.75	14.50	AST Research Inc.*	19.00	1.75	10.14
NYS	21.63	10.13	Commodore Int'l	13.88	-0.50	-3.48
NYS	67.00	22.13	Compaq Computer Corp.*	28.63	-0.13	-0.43
OTC	40.75	20.25	Dell Computer Corp. (H)	40.75	5.25	14.79
OTC	7.75	3.00	Everex Systems Inc. (H)	6.88	0.00	0.00
NYS	34.00	21.25	Harris Corp. (H)	33.00	1.25	3.94
NYS	82.38	44.63	Hewlett-Packard Co.* (H)	82.38	5.00	6.46
OTC	20.88	7.88	Mips Computer Systems	13.38	0.38	2.88
NYS	29.75	13.25	Silicon Graphics (H)	22.25	1.00	4.71
OTC	38.63	20.75	Sun Microsystems Inc.*	30.38	-2.13	-6.54
NYS	36.50	23.38	Tandy Corp.*	29.88	0.13	0.42
NYS	11.13	5.13	Zenith Electronics (H)	9.50	0.50	5.56
OTC	25.50	13.50	Zeos International Ltd.	14.00	-0.75	-5.08

Large Systems

Off 0.40%

ASE	20.63	11.63	Amdahl Corp.* (H)	17.50	-0.50	-2.78
OTC	2.63	0.81	Computer Automation Inc. (L)	0.94	0.06	7.20
NYS	13.38	7.50	Control Data Corp.	12.75	0.50	4.08
NYS	19.75	8.88	Convex Computer	13.88	-0.50	-3.48
OTC	19.63	4.13	Cray Computer	5.50	-0.38	-6.38
NYS	52.25	31.50	Cray Research Inc.*	44.50	1.75	4.09
NYS	22.50	10.38	Data General Corp.	10.63	0.13	1.19
NYS	74.25	48.50	Digital Equipment Corp.*	56.75	-3.13	-5.22
NYS	114.75	83.50	IBM*	86.13	-3.25	-3.64
NYS	131.00	93.50	Matsushita Electronics (L)	100.00	3.50	3.63
OTC	29.50	10.75	Pyramid Technology	16.25	0.25	1.56
OTC	18.50	7.50	Sequent Computer Sys.	14.13	-0.25	-1.74
OTC	18.38	10.13	Sequoia Systems Inc.	14.00	-0.13	-0.88
NYS	54.25	27.25	Stratus Computer Inc.* (H)	50.00	-1.25	-2.44
NYS	17.63	9.50	Tandem Computers Inc.*	12.50	-0.13	-0.99
OTC	4.75	1.25	Tandem Corp.	1.50	-0.13	-7.69
NYS	11.75	3.25	Unisys Corp.* (H)	9.88	0.75	8.22
ASE	7.50	2.00	Wang Labs Inc. (b)* (H)	6.13	-0.13	-2.00

Software & DP Services

Up 1.37%

OTC	68.50	41.25	Adobe Systems Inc.	54.75	2.75	5.29
OTC	13.25	3.50	AI Corp. (H)	9.88	0.50	5.33
OTC	59.88	26.25	Aldus Corp. (L)	26.25	-1.75	-6.25
OTC	19.75	10.13	American Software Inc. (H)	17.63	0.75	4.44
OTC	20.00	7.13	Ask Computer Systems (H)	17.13	-0.13	-0.72
OTC	62.25	23.25	Autodesk Inc. (L)	32.00	2.25	7.56
OTC	37.75	17.00	Bachman Info. Systems (H)	25.50	-0.25	-0.97
OTC	42.50	25.88	BGS Systems Inc. (H)	36.00	-0.75	-2.04
OTC	79.00	33.00	BMC Software Inc.	63.25	0.75	1.20
OTC	18.50	8.75	Boole & Babbage (H)	18.25	1.00	5.80
OTC	86.75	39.50	Borland Int'l Inc.*	68.50	0.75	1.11
OTC	11.25	4.75	CE Software	8.75	0.25	2.94
ASE	20.63	9.75	Cheyenne Software Inc. (H)	18.50	-0.88	-4.52

Exch 52-Week Range

March 20 Close Wk Net Change Wk Pct Change

OTC	20.88	7.50	Cognos Inc.	8.63	-1.13	-11.54
NYS	17.00	7.25	Computer Associates* (H)	16.75	1.00	6.35
OTC	22.75	12.00	Comshare Inc.	17.50	1.50	9.38
OTC	47.88	15.00	Easel Corp.	41.25	0.63	1.54
OTC	16.25	9.25	Goal Systems Int'l	14.75	2.25	18.00
OTC	32.50	11.50	Group 1 Software	21.75	1.75	8.75
OTC	7.00	4.25	Hogan Systems Inc.	5.63	0.13	2.27
OTC	36.25	17.75	Information Resources (H)	27.25	-0.38	-1.36
OTC	33.00	4.88	Informix Corp. (H)	30.63	4.63	17.79
OTC	3.63	1.06	Intellipoint Inc.	1.94	0.06	3.36
OTC	31.50	16.25	Intergraph Corp.	19.25	0.50	2.67
OTC	15.00	4.88	Interleaf Inc. (H)	12.25	-0.50	-3.92
OTC	20.25	7.38	Intersolv Inc.	17.63	-0.38	-2.08
OTC	43.25	10.50	Knowledgeware Inc.	17.00	-0.50	-2.86
OTC	45.25	20.25	Legent Corp.* (H)	39.50	0.00	0.00
OTC	40.75	18.00	Lotus Development*	36.88	-1.75	-4.53
OTC	7.38	2.38	Meca Software	4.75	-1.38	-22.45
OTC	22.25	11.50	Mentor Graphics (H)	18.75	0.50	2.74
OTC	30.25	9.75	Micrograph Inc.	26.25	2.00	8.25
OTC	133.25	60.50	Microsoft Corp.*	128.50	7.50	6.20
OTC	21.13	7.00	Oracle Corp.* (H)	15.88	-1.13	-6.62
OTC	35.63	10.63	Parametric Technology	30.25	0.75	2.54
OTC	10.75	5.88	Phoenix Technologies (H)	9.75	0.88	9.86
OTC	25.25	9.00	Platinum Technology	19.25	-1.00	-4.94
OTC	46.50	27.50	Progress Software Corp.	45.00	1.25	2.86
OTC	26.63	11.50	Quarterdeck Office Sys.	19.50	0.75	4.00
OTC	29.75	10.00	Rasterops	21.75	-0.25	-1.14
OTC	17.25	6.75	Ross Systems (H)	15.25	-0.25	-1.61
OTC	26.25	12.50	Software Publishing Corp.	24.00	-0.63	-2.54
OTC	8.50	2.00	Software Toolworks Inc.	6.88	0.88	14.58
OTC	7.25	1.75	Spinnaker Software	5.13	-0.13	-2.38
OTC	16.50	6.25	State of the Art (H)	13.63	-0.50	-3.54
NYS	25.25	10.88	Sterling Software Inc. (H)	21.75	-0.13	-0.57
OTC	30.00	15.38	Struct. Dynamics Research	18.25	-2.75	-13.10
OTC	31.75	15.00	Sybase Inc. (H)	27.25	2.25	9.00
OTC	51.00	19.50	Symantec Corp.	47.00	2.75	6.21
NYS	15.50	6.38	Systems Center Inc.*	10.63	-0.25	-2.30
OTC	31.00	8.34	System Software Assoc. (H)	29.00	0.50	1.75
OTC	6.63	2.75	Wordstar	4.06	0.06	1.57

Semiconductors

Up 0.44%

NYS	21.50	8.38	Advanced Micro Devices	18.63	0.75	4.20
NYS	12.50	7.00	Analog Devices Inc.	9.75	0.75	8.33
OTC	18.88	6.75	Atmel Corp.	10.38	-0.38	-3.49
OTC	14.13	7.00	Chips and Technologies (H)	11.63	-0.88	-7.00
NYS	24.50	13.38	Cypress Semiconductor Corp	15.75	-0.88	-5.26
NYS	12.38	6.25	Dallas Semiconductor	8.88	0.38	4.41
OTC	68.75	38.50	Intel Corp.* (H)	65.00	1.00	1.56
NYS	12.50	6.50	LSI Logic Corp.	7.75	-0.25	-3.13
NYS	22.38	10.88	Micron Technology (H)	16.13	0.00	0.00
NYS	82.50	54.00	Motorola Inc.* (H)	77.75	2.38	3.15
NYS	11.50	3.88	National Semiconductor* (H)	10.50	0.13	1.20
OTC	27.00	13.00	Sierra Semiconductor	17.38	-0.38	-2.11
NYS	47.63	26.00	Texas Instruments*	34.25	0.88	2.62
OTC	12.25	5.88	VLSI Technology	9.88	0.38	3.95
OTC	16.75	4.50	Weitek	5.50	-0.38	-6.38
ASE	6.25	2.00	Western Digital Corp.	4.00	0.00	0.00
OTC	32.50	19.25	Xilinx	29.50	1.25	4.42
OTC	11.50	4.25	Zilog Inc. (H)	8.75	0.13	1.45

IN BRIEF

Integrator boosts its profits 50%

■ Profits are up again at systems integration and consulting firm **Technology Solutions Co.** For its third quarter, the Chicago company posted profits up 50% year-over-year to \$2.7 million on revenue of \$17.2 million — a 40% increase over sales logged in the same quarter last year.

■ Berkeley, Calif.-based **Software Alliance Corp.** last week announced what is among the first products targeted at user firms that are mulling a move to outsourcing. Software Alliance's offering, **Enterprise 2000**, is an extensive suite of Unix-based banking applications. Its open platform, the company said, will give financial institutions the same cost savings as will "main-frame-based outsourcing services" at a fraction of the "costs associated with such solutions."

■ Chicago-based **System Software Associates, Inc.**, purveyor of software and services for the IBM Application System/400, took a look at a 40% increase in its Asian sales and acted to deepen its stakes in the booming region by acquiring its Singapore-based ally, **Comat Services Pte.** Comat, which has approximately 70 employees, is now called **SSA Singapore**.

■ Industry veteran **John F. Cunningham** has been named to the board of directors at Vero Beach, Fla.-based marketing communications firm **Redgate Communications Corp.** The 6-year-old, venture-backed Redgate is hoping to benefit from its latest director's experiences, which include two years as president of **Wang Laboratories, Inc.** and his turnaround of Computer Consoles, Inc.

Computer firms' IPOs predicted to rocket

BY NELL MARGOLIS
CW STAFF

NEW YORK — Low interest rates and high interest in technology as a profitable investment could spur a stampede of computer companies to the public market this year, according to market research firm Technologic Partners.

That is not necessarily good news for the suddenly popular firms and their customers, Technologic President Richard A. Shaffer said. Today's sweet spot on investors' agendas, he noted, could sour if enthusiasm for technology-based public offerings inflates the firms' valuations unrealistically, thereby setting up firms to disappoint their investors' expectations.

Technologic's recently issued annual forecast of technology-related initial public offerings (IPO) foresees a bumper crop of 1992 IPOs — an estimated 60, up 30% from last year's total and 20% more than the 1986 and 1987 levels. Technologic esti-

mates that this will translate into a total dollar value of \$1 billion to \$1.5 billion.

Early in the game, California is already looking like a good bet to repeat its 1991 record and yield the lion's share of the 1992 technology debutantes (see chart). Not all trends, however, are likely to be so predictable. For instance, Shaffer noted, semiconductor start-ups seem to be in vogue for the first time in recent memory.

The technology venture capital market, only recently on the wane, is aburst with vitality for a variety of economically motivated reasons,

Shaffer said. IPOs in general, he explained, are reaping the dollar benefits of a backlash against

large company stocks, which have spent the past several months biting the investors who embraced them in 1991.

Add the comparative sheen that equity investment takes on when declining interest rates rub the glow off debt, top it with the expectation that technology stocks are due for a continuation and escalation of the resurgence seen recently, and you have the makings of a possible funding bonanza.

However, this could cause inflated expectations on fledgling technology companies, some still working through precarious research and development stages.

Motley crew

The class of tech firms most likely to go public in 1992 packs some heavy mettle and includes the following:

Actel, Sunnyvale, Calif.: semiconductor devices that provide programmable gate arrays

Broadband Technologies, Raleigh, N.C.: fiber optics in the telephone loop

Cadre Technologies, Beaverton, Ore.: CASE and project management tools

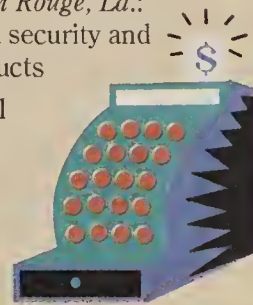
Community Health Computing, Houston, Texas: health care information systems

Dataware Technologies, Cambridge, Mass.: CD-ROM software applications

Fifth Generation Systems, Baton Rouge, La.: hardware and software utility, data security and peripheral sharing computer products

Intuit, Menlo Park, Calif.: financial software for homes and small businesses

Next, Redwood City, Calif.: workstations for educational and commercial markets



Source: Technologic Partners

CW Chart: Janell Genovese

Gupta hires execs, revamps products

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — Gupta Technologies, Inc. shuffled its top management ranks last week, adding former Oracle Corp. and Netwise, Inc. executives in an effort to capitalize on the growing downsizing phenomenon.

The changes come as the \$20 million firm revamps its entire product line by enhancing its local-area network-based relational database management system, gateways to IBM main-frame databases, application development tool kit and network connectivity products.

Gupta's product and management moves prompted some industry analysts to suggest that Chief Executive Officer Umang Gupta was not satisfied with fiscal 1992 sales. "It's like Gupta is saying, 'Our products are great, our message is great, so maybe it's the carriers of the message that need to be changed,'" said Chris Le Tocq, a senior research analyst at Computer Intelligence/Infocorp in Santa Clara, Calif.

The privately held firm, founded in 1984, said it hoped to reach the \$35 million revenue mark last year, according to CEO Gupta. Last fall, he said he wanted to take the firm public in the mid-1990s. "They know

they missed their takeoff because they're not a big company," explained Tom Wood, a senior industry analyst at the Business Research Group in Newton, Mass. "They want to catch the next wave of client/server computing and ride it all the way in to the beach."

Wood added that Novell Inc., which owns 20% of Gupta, may want Gupta to create more database-related products for NetWare. Novell has already produced a NetWare Loadable Module for Gupta's SQLbase 5.0 RDBMS, which Gupta is selling.

New managers

Gupta recently hired executives with experience in client/server sales and marketing. The company appointed Gene Shklar, a former Oracle marketing executive, as vice president of U.S. marketing, while Michael Fabry, former vice president of sales at Netwise in Boulder, Colo., was named vice president of corporate sales, a new position.

Shklar succeeds Reed Tausig, former marketing vice president, who was named senior vice president of North American sales and marketing.

Gupta's enhanced products include: Quest 1.2, an end-user query tool for access to relational databases such as IBM's DB2 and Oracle's Version 6.0;

SQLWindows 3.1, a fourth-generation language for Microsoft Corp.'s Windows 3.0 that is now packaged with a single-user RDBMS; SQLbase for Windows, a multitasking single-user ver-

sion of SQLbase 5.0; and SQLNetwork for DB2 3.0, which links end users with IBM's DB2. According to Gupta, the Quest 1.2 and SQLWindows 3.1 products will ship by April 1; SQLbase for Windows and SQLNetwork for DB2 are due for shipment by June.

Second MCC spin-off aims for manufacturing market

BY KIM S. NASH
CW STAFF

AUSTIN, Texas — Microelectronics and Computer Technology Corp. (MCC) recently gave birth to its second child in nine years.

Pavilion Technologies, based here, was launched by a team of MCC engineers working with researchers at Eastman Kodak Co., one of the consortium's 22 shareholders. Backed by first-round seed money from a Dallas-based venture capital firm, Pavilion is taking aim at the manufacturing process control market with software that uses neural network and fuzzy logic technologies.

The Pavilion team started working on the technology three years ago and plans an April product launch, said Craig Fields, MCC's president and

chief executive officer.

Process Insights, as the manufacturing process control package is called, will be targeted at chemical and petroleum firms running Digital Equipment Corp. VAX/VMS or Unix machines.

According to Pavilion CEO Ron Riedesel, early tests of Process Insights have resulted in efficiency gains of up to 30% at user sites. Pavilion may expand into other industries where process control is important, such as semiconductor fabrication, Riedesel said.

Pavilion is the second firm spun from the research and development consortium following the December 1991 launch of Evolutionary Technologies, Inc., a database conversion tool maker [CW, Dec. 2, 1991].

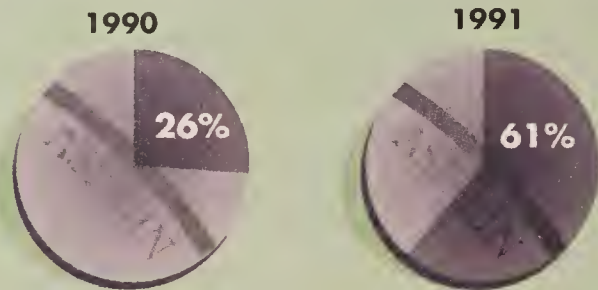
Pavilion has signed up one customer — Eastman Chemical Co., a division of Kodak.

TRENDS

VIRUSES

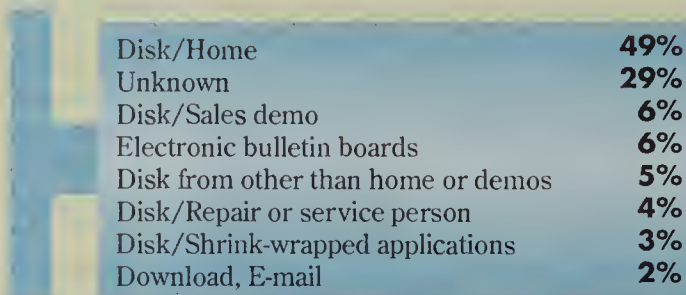
Here to stay

Virus encounters are on the rise, as the percentage of respondents who have experienced a virus has more than doubled since 1990



Entry points

Most viruses are passed via floppy disks (67%), with the biggest culprits coming from home*



*multiple responses allowed

Top virus-related problems*

Loss of productivity	62%
Screen message interference, lockup	41%
Corrupted files	38%
Lost data	30%
Unreliable applications	24%
System crash	23%

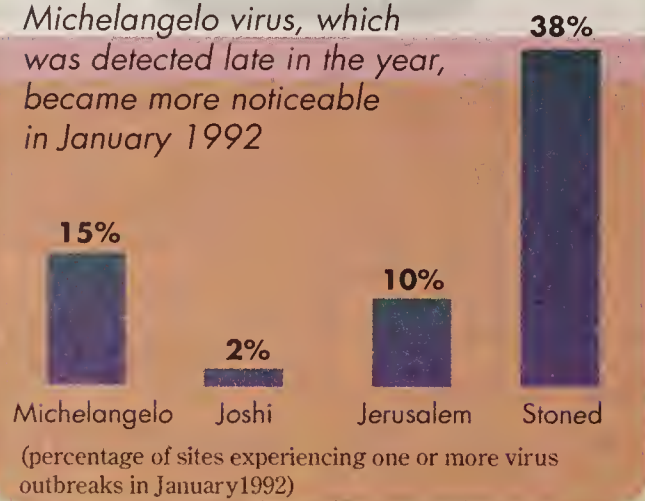
*multiple responses allowed
Base: 600

BY THE NUMBERS

According to a recent survey by Dataquest, Inc., there were more than 2,500 virus occurrences in 1991 vs. 756 in 1990.

Respondent base: 300 sites, each with over 300 installed PCs. All charts indicate percentage of respondents.

During 1991, two viruses — Stoned and Jerusalem — accounted for the majority of virus incidences. However, the Michelangelo virus, which was detected late in the year, became more noticeable in January 1992



Source: Dataquest, Inc., San Jose, Calif., and National Computer Security Association, Washington, D.C.

CW Chart: Janell Genovese

N E X T W E E K

Power goes out. Systems crash. Data is lost. Who's responsible? How about when an out-sourcer is involved? Increasingly, courts are holding IS professionals and their companies more responsible for losses caused by systems errors. How do IS chiefs such as **Fred Cisewski** at Bank South handle such challenges? See Executive Report.



Blowing your own horn may get you ahead in your boss' eyes but not in the eyes of co-workers. IS workers who want to advance can find a balance between self-promotion and the respect of co-workers by dropping subtle hints to managers, getting involved in high-profile projects and keeping things running smoothly. See Computer Careers next week.

INSIDE LINES

Outmuscling Big Blue?

► The Microsoft marketing machine has started rolling and is making a lot of noise in the process. Last week's Windows 3.1 preannouncement will be followed by a cloudburst of Windows-related shindigs, including the release of Excel 4.0 and a Windows-to-mainframe connectivity get-together today in New York. Meanwhile, not a peep from IBM about OS/2 2.0. A better Windows than Windows? Technologically, that question has yet to be answered. Marketing-wise? It's not even a race.

Still in neutral

► The new IBM PC organization is taking some time to heat up, as far as Jackie Bynsdorp, PC coordinator at Jockey International, is concerned. She says she's been trying to get the specs on the 56SLC desktop PC from her IBM rep since the product was announced in late February. She just got them last week.

Getting jobbed!

► A war of words has broken out between Steve Jobs' \$150 million Next and Scott McNealy's \$3 billion workstation giant Sun. Spurred on by an internal memo, Sun's salespeople have been making presentations that slam Next up and down and ultimately ask the question: "Do you really want to put your future in Steve Jobs' hands?" Next has fired off a 10-page salvo of its own, responding to each of the 30 points raised in the Sun memo. Some observers say that Sun's memo adds credence to Jobs' claim that he's taking business away from Sun.

Scribbling along

► Add Lotus to the list of companies that will be talking up the pen market at next month's Comdex/Spring '92. While the Cambridge, Mass.-based firm will make no new announcements, reports are that it is crafting pen-centric versions of its Notes and CC:Mail products. "Applications communications is the missing link in the pen market," one source said. "Lotus intends to fill that."

Getting smaller

► One user thinks Microsoft will bundle the Stacker compression product, which doubles hard drive space, with DOS 5.1 when the operating system upgrade appears — probably in the September/October time frame. Quoth the user, "I asked them about it, and they said they couldn't tell me, but they could say that Stacker works very well with DOS 5.0."

Thorny problems

► Apple engineers are working to solve four nagging technical glitches with the popular PowerBook portables. Two prevent some internal floppy drives from reading 800K-byte disks, and one is caused by the magnetic field of the PowerBook 140, which interferes with the machine reading or writing large files. The fourth problem is a rare defect that causes telephone cords to become stuck in the PowerBook's internal modem. A company spokeswoman said all PowerBooks remain under warranty.

Bundles galore

► Tuesday's notebook announcements from IBM will also see the announcement of some monitor bundling in the PS/2 line. The Model 35 will be available in a 40M-byte hard drive version with a 14-in. color monitor and an 80M-byte version with a slightly lower grade monitor. Pricing on the bundles will be \$1,995 and \$2,235, respectively — not bad, considering that a Model 35 sells for \$2,255 by itself.

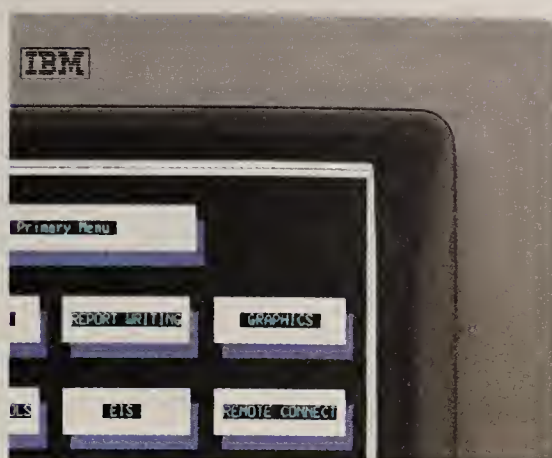
Three months after declaring a measure of independence from its Armonk, N.Y., headquarters, IBM's San Jose, Calif., disk drive division announced its new name. It's AdStar, a sobriquet selected from among 2,000 that were dreamed up by the division's 17,000 employees worldwide. The name, which is certainly catchy for an IBM moniker, stands for a serious concept, of course: "advanced storage and retrieval." You really can't expect IBM to change all of its stripes overnight. Any other changes in the offing at IBM? Phone, fax or CompuServe News Editor Alan Alper at (800) 343-6474; (508) 875-8931 or 76537,2413, respectively.

No Matter How You Slice It

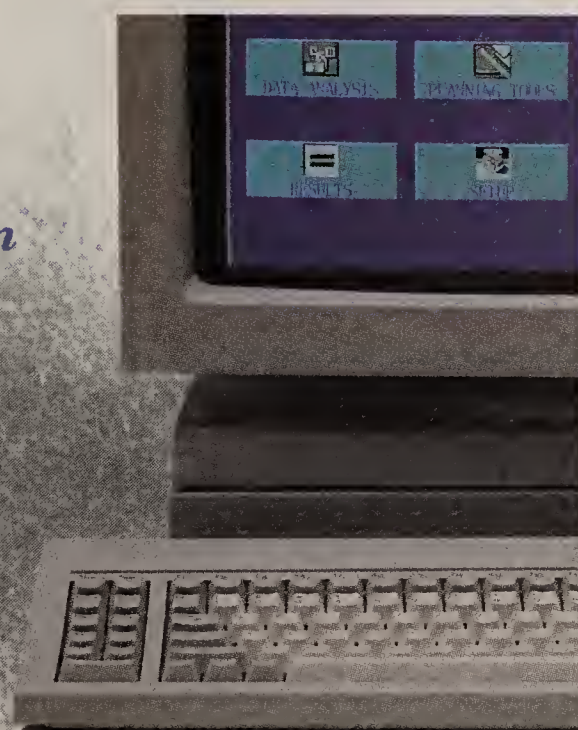
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Computer*



Mainframe



Workstation



Minicomputer



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